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Braxy-Like Diseases of Sheep

1.—THE MECHANISM OF ENTERO-TOXAEMIA*, WITH PARTICULAR REFERENCE TO *CL. WELCHII TYPE D*

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The objects of this investigation were to attempt to discover a simple method by which sheep could be made to succumb to an entero-toxaemia in a manner comparable to that by which they contract the disease under natural conditions, namely, by ingestion of the causal organisms, and secondly, to study the mechanism which allows organisms of the *Cl. welchii* group to multiply and produce toxin in the alimentary tracts of sheep. It was decided to confine the investigation mainly to *Cl. welchii Type D*, the organism associated with pulpy-kidney disease of lambs and entero-toxaemia of adult sheep (Bennetts, 1932. Montgomerie, 1935).

A disease which was probably pulpy-kidney disease was described by Gilruth in New Zealand and in Tasmania in the early years of this century (Gilruth, 1910). In 1927 Seddon reported the occurrence of the disease in Australia and in the same year Gill described it in New Zealand. Stewart (1929) reported that a similar disease occurred in the Eastern Counties of England but that the lambs affected were older than in the New Zealand and Australian outbreaks. Montgomerie and Rowlands (1931) reported the disease in lambs in North Wales and although they found a toxic substance in the contents of the small intestine, were unable to identify it as a bacterial toxin. In 1932 Oxer in Tasmania and Gill in New Zealand concluded that the disease in their respective countries was an entero-toxaemia due to *Cl. welchii Type D* (*B. ovitoxicus*, Bennetts, 1932). In 1933 Montgomerie and Rowlands recognised that the disease they had investigated in 1931 was an entero-toxaemia caused by *Cl. welchii Type D*. These investigations proved that *Cl. welchii Type D* was the causal micro-organism of pulpy-kidney disease but failed to explain the conditions which allowed the organisms to grow in the alimentary tract.

*The term "entero-toxaemia" is employed to denote toxaemia due to absorption from the alimentary tract of the toxin of an organism of the *Cl. welchii* group.

Attempts to reproduce entero-toxaemia by oral administration of infective material were made by Dalling in connection with lamb dysentery (Dalling, 1926). Although lamb dysentery differs from entero-toxaemia caused by *Cl. welchii Type D* in that ulcerative lesions of the mucosa of the small intestine are frequently present, it is of interest to note that the feeding of cultures of a strain of *Cl. welchii* which had been isolated from a case of lamb dysentery set up the disease when fed alone in 1926 whereas in a previous season in six experiments the disease could only be reproduced when cultures of *B. coli* were administered with *Cl. welchii*. Moreover, in one experiment in 1926, *Cl. welchii* alone failed to affect the lambs' health. McEwen and Roberts (1931) reproduced the disease known as "struck" in Kent by the feeding in large quantities of broth culture of *Cl. welchii Type C* (*B. paludis*, McEwen, 1930). Bennetts (1932) describes experiments in which entero-toxaemia was produced by administration of opium, belladonna and bicarbonate of soda in conjunction with cultures of *Cl. welchii Type D*, but when bacteria were fed with the bicarbonate only the animals remained well. Gill (1933) reports failure to produce pulpy-kidney disease in lambs by feeding of cultures even when Bennetts' method was adopted. McEwen (1933) produced death in eight out of twelve sheep at pasture by feeding *Cl. welchii Type C* in capsules. He refers to the result as not anticipated in view of past difficulty in setting up infection by oral administration; in a further experiment eight sheep fed on widely different rations, in groups of two, responded irregularly to the feeding of the organisms in capsules. It may be concluded that success has sometimes attended attempts to reproduce entero-toxaemia by oral administration of culture, but it has been difficult to explain this success. No report of the successful production of pulpy-kidney disease by the feeding of cultures of *Cl. welchii Type D* can be traced in the literature.

During the course of a field investigation

carried out by the writer in the Western Highlands of Scotland in 1937 a number of cases of pulpy-kidney disease was encountered in lambs a few days old. Because of their age and from the appearance of the contents of the alimentary tract it was concluded that they were on a pure milk diet. The diagnosis was made by serum neutralisation tests on the toxin present in the alimentary tract and by isolation of *Cl. welchii Type D* from the contents of the small intestine. It was argued from this that the simplest manifestation of entero-toxaemia is that caused by *Cl. welchii Type D* in animals in which the physiological functions of the rumen, reticulum and omasum are in abeyance. The advantage attached to the use of the D type rather than the B type lies in the simpler antigenic structure of the toxin of the former. It was believed that some indication of the probable behaviour of *Cl. welchii* in the alimentary tract of such an animal might be gained by *in vitro* experiments. At least, it was hoped to ascertain whether secretions with which the organisms must come into contact during their passage through the alimentary tract had bactericidal, growth inhibiting, growth promoting or toxin activating influences. In the following account of experimental work, Experiments 1 to 11 were carried out with this object in view and the remainder of the work is concerned with the behaviour of *Cl. welchii Type D in vivo.*

IN VITRO EXPERIMENTS

For practical reasons it is obvious that natural sheep's milk could not be employed for the *in vitro* experiments but an attempt was made to use an "adjusted milk," resembling sheep's milk in composition, by using a proprietary skimmed milk powder, casein and cod-liver oil in the following proportions:—60 c.c. milk powder, 12 grammes casein, 7·5 c.c. cod-liver oil and 600 c.c. water. Preliminary experiments indicated that this "adjusted milk" was an unsuitable medium for the *in vitro* experiments, the coagulum produced being tenacious and complete emulsions being difficulty to obtain. It was therefore decided to employ fresh cow's milk sterilised by heating at 80° C. for 20 minutes as a medium, and, where the result depended upon the counting of colonies, to inoculate control plates with milk only; haemolytic colonies were never observed on these plates. The *p*H of the milk remained constant at 7 throughout the experiment. In the earlier experiments the tubes were clipped to a slowly revolving wheel while in the incubator but this was found to have little influence upon the results and in the greater part of the work incubation at 37° C. has been carried out in rubber stoppered tubes in a water bath, the tubes being shaken at intervals during incubation. No other means were employed to induce anaerobiosis.

The strain of *Cl. welchii Type D* used was obtained from a case of pulpy-kidney disease in 1937 and was typed at the time of isolation and at the commencement of the experiments. The numbers of organisms in a milk culture were estimated by cultivation on blood-agar plates, the inoculum being maintained at ·05 c.c. throughout. Where the experiments concerned organisms in a vegetative form the plates were observed after incubation in a Macintosh and Fildes jar at 37° C. for 24 hours only, but when resistant forms were being examined a further observation was made after six days. The colonies were recognised by appearance and by picking a small number into milk medium to observe the "stormy clot" reaction. In a few instances they have been picked into a broth culture and the type of toxin established.

Experiment 1.

This experiment was designed to give an indication of the fate of *Cl. welchii Type D* in the presence of acid and milk. Freshly drawn milk was titrated with N/2 hydrochloric acid, dimethyl-amino-azo-benzene (Topfer's reagent) being employed as an indicator of the presence of free acid. It was found that 27 c.c. of the N/2 acid was required to produce evidence of free acidity in 100 c.c. of the milk. For purposes of recording and discussion, use is made of clinical units of free acidity, the acidity being expressed in terms of the volume in c.c. of N/10 sodium hydroxide required to neutralise the free acid in 100 c.c. of the medium. As the above milk requires the equivalent of 135 c.c. of N/10 acid to induce the appearance of free acid in 100 c.c. it may conveniently be referred to as −135 units.

Ten c.c. quantities of the milk were distributed in test-tubes and N/2 hydrochloric acid added in serial quantities (Graph 1) to produce acidity varying from —135 units to +50 units. Each tube was then inoculated with 1 c.c. of a 24 hour broth culture of *Cl. welchii Type D*, shaken vigorously for two or three seconds, and a sample removed and inoculated on blood-agar plates in dilutions of 1 in 20 and 1 in 400. The tubes, together with a tube containing uninoculated milk, were placed in a water bath at 37° C. for 40 minutes. Samples from each tube were then inoculated on blood-agar plates by the same technique and in the same dilutions as before. The results are shown as a graph (Graph 1) in which the ordinate is the units of acidity and the axis the percentage of organisms remaining viable as estimated by colony counts. The plates inoculated before incubation all gave

an uncountable number of colonies at the 1:20 dilution and from 200 to 340 at the 1:400 dilution; there was a slight reduction in the number of colonies at the acid extreme of the series at the latter dilution. Plates inoculated with milk only remained sterile. It is seen from the graph that, after incubation, viability is abruptly affected and that 1 per cent. only of the organisms remain viable at the free acid point. The original concentration of bacteria in the medium as estimated by plate counts was 2,500,000 per c.c.

This experiment was carried out three times and consistent results were obtained except that complete sterility of plates made after incubation was only obtained in one experiment, and that the abrupt fall in the number of organisms remaining viable occurred at any point between —20 to +20 units. Four colonies of organisms which had survived incubation in the presence of 40 units of acidity were picked into broth and examined for toxin production. Each produced toxin of the D type. It should be emphasized that the experiment was designed to ascertain the effect of degrees of acidity within the widest limits which may be anticipated to occur in the stomach and that no attempt was made to demonstrate an absolute sterilising effect. Although some plates inoculated with a 1:20 dilution remained sterile, viable organisms could probably be demonstrated by increasing the inoculum. The results of these experiments suggest that the viability of *Cl. welchii Type D* in milk acidified with hydrochloric acid may be related to the amount of free acid present. The margin between acidity which has no effect upon the organisms and that which causes a 99 per cent. reduction in viability is remarkably narrow, and is readily affected by slight variation in the technique of the experiment. The interval which elapses between the addition of acid and inoculation of the medium with the organisms is an important cause of variation. This is shown by the following experiment in which a part of the above experiment was repeated in duplicate, the interval between the addition of acid to the milk and the inoculation of the organisms being varied. The technique was identical with that described above. (Table I.)

The effect of the acid upon viability is thus greater when the acid is in contact with the medium for a shorter interval. This is probably due to the fact that the reaction between casein and the acid is not instantaneous and that free acid present immediately after addition of the acid is later taken up to form the hydrochloride.

Some indication was obtained in the above experiment that the effect of the acid upon the organisms was rapid. To confirm this,

Table I

Acidity.—	Percentage of Organisms Remaining Viable.	
	Acidified 5 Minutes before Inoculation.	Acidified 1 Hour before Inoculation.
Units.		
—135	100	100
—40	50	100
—20	50	100
0	8	40
+20	1	1·3
+40	0	0·7

milk with +50 units of free acidity was distributed in 10 c.c. quantities in stoppered test-tubes, heated to 37° C. and 1 c.c. of a 24 hour broth culture of *Cl. welchii Type D* inoculated into each. They were incubated in a waterbath at 37° C. and cultures were made on blood agar plates at intervals of 5 minutes up to 40 minutes, using ·05 c.c. of the undiluted medium and dilutions of 1 in 20 and 1 in 400. The results are calculated in terms of percentages of the number of colonies on plates inoculated from a corresponding tube of milk to which no acid had been added (Table II).

Table II

Duration of Incubation.	Percentage of Organisms Remaining Viable.
Minutes.	
5	1·8
10	1·25
15	1·5
20	1·1
25	0·75
30	1·0
35	1·1
40	0·8

The effect of the acid upon viability is thus shown to be exercised almost entirely within five minutes of contact with the organisms.

Experiment 2.

In order to determine whether viability in contact with acid was affected by the age of the culture, 200 c.c. of a broth culture of *Cl. welchii Type D* was centrifuged, the bacteria resuspended in 20 c.c. of saline solution and kept in the dark at room temperature for 14 days. Two tubes containing 10 c.c. of milk, acidified to the point of appearance of free acid, were inoculated with 1 c.c. of this suspension and two similar tubes inoculated with a 24 hour old culture of the same organism. Plates were sown with ·05 c.c. of 1 in 20 and 1 in 400 dilutions and all the tubes incubated in a waterbath at 37° C. for 1 hour. Plates were again made using the same dilutions. Colonies were counted after incubation of the plates for 24 hours. Incubation for one hour in the presence of acid reduced the number of viable organisms in the old sus-

pension and in the 24 hour culture to approximately 1 per cent. The experiment indicated that the effect of acidity upon viability is similar in fresh cultures and in a 14 day old suspension.

Experiment 3.

As it is uncertain whether entero-toxaemia in animals follows the ingestion of vegetative forms in faeces or of resistant forms from earth or faeces some interest is attached to the fate of heat resistant forms brought into contact with acid. A three-month-old meat-broth culture of *Cl. welchii Type D* was heated at 80° C. for 20 minutes. Serial quantities of hydrochloric acid were added to a series of seven tubes of milk and 1 c.c. of the heated culture was added to each and to a tube of milk containing no acid. They were placed in a waterbath at 37° C. for 40 minutes and plates were inoculated with ·05 and ·005 c.c. from each tube. Minced meat broth tubes were inoculated with ·25, ·05, ·025 and ·005 c.c. respectively but, although they were observed over a period of twenty days, the results were irregular. Tubes which failed to yield colonies upon plates did, however, give negative results in the minced meat broth. The plates were observed after incubation for 24 hours and six days. At 24 hours from 1 to 9 colonies were present in an irregular manner on all plates except those made from uninoculated milk. The colony counts at six days are recorded as a percentage of the number obtained from unacidified milk (Table III).

Table III

Units of Acidity.	Percentage of Organisms remaining Viable.
—135	100
—45	4·8
—20	0·6
0	0·3
+25	0·2
+40	0·3
+55	0·3

The experiment was repeated, but the heated old culture was allowed to remain in contact with the medium for 3½ hours. The plate counts after incubation for six days are recorded in Table 4 as a percentage of the number of colonies on unacidified milk.

Table IV

Units of Acidity.	Percentage of Organisms remaining Viable.
—135	100
—45	1·6
—20	1·5
0	1·0
+25	1·0
+40	1·1
+55	1·0

The first experiment was repeated with unheated three-month-old culture and an essentially similar result obtained.

The results of these experiments are unexpected and appear to show that heat and age resistant forms are as susceptible as, if not more susceptible than, vegetative forms to the action of acid.

Experiment 4.

There was reason to suppose that the viability of vegetative forms of *Cl. welchii Type D* in a milk medium containing acid was dependent upon the absence of free acid, that is, acid not in combination with the casein of the milk as a hydrochloride. A preliminary experiment was carried out in which the percentage of casein in the milk was reduced by the simple process of dilution of the milk. Milk was acidified to −60 units, and the same quantity of acid was then added to each of a series of tubes containing an equal volume of milk dilutions. Each tube was inoculated with 1 c.c. of an 11-day-old suspension of the bacteria collected from a broth culture of *Cl. welchii Type D*. Material from each tube was inoculated on plates immediately after the addition of the bacterial suspension. The tubes were then incubated in a waterbath at 37° C. for two hours and again plated in dilutions of 1 in 20 and 1 in 400. The plates were observed after incubation for 24 hours. The results (Table V), show a rapid increase in the effect of the acid on viability as the milk is diluted. Estimation of the acidity of the tube showed abundant free acid in all the dilutions.

Table V

Milk Dilutions.	Number of Colonies, expressed as a Percentage of the Number from the same Dilution before Incubation.
Undiluted	100
1 in 2	18
1 in 4	0·1
1 in 8	0
1 in 16	0
1 in 32	0

The experiment was repeated using a 24 hour culture of *Cl. welchii Type D*. and an essentially similar result was obtained. The results indicate that the effect on viability is not dependent on the total amount of acid added but upon some component of the medium, as a decrease in the concentration of the medium leads to an increased effect upon viability.

Experiment 5.

The result of Experiment 5 suggested that the acid may be rendered innocuous by combination with casein and this experiment was designed to examine this hypothesis.

Progressively increasing quantities of casein, from ·03 to ·27 grammes, were added to each of a series of tubes containing 10 c.c. of milk diluted to 1 in 10 with saline solution. The highest concentration of casein would thus be approximately 3 per cent., compared with 2·9 per cent. in normal cow's milk. Equal amounts of N/2 hydrochloric acid were added and 1 c.c. of a 24 hour broth culture of *Cl. welchii Type D* was inoculated into each tube. They were placed in a waterbath at 37° C. for one hour and plates were made with 1 in 20 and 1 in 200 dilutions of the medium. Colonies were counted after incubation for 24 hours. The result shows that the effect upon viability is inversely proportional to the amount of casein present (Table VI), and further supports the view that hydrochloric acid bound to casein as a hydrochloride does not affect the viability of the organisms.

Table VI

Percentage of Casein added to 1 in 10 Dilution of Milk.	Colony Counts from Plates Inoculated after 1 hour Incubation, expressed as a percentage of the Number on Controls.
2·7	100
2·4	100
2·1	100
1·8	100
1·5	100
1·2	100
0·9	25
0·6	25
0·3	14
0·0	0·3

Experiment 6.

To determine whether the behaviour noted in the case of *Cl. welchii Type D* was peculiar to that type or common to all types of *Cl. welchii*, an experiment similar to Experiment 1 was carried out with Types A, B and C. Three series of tubes containing 10 c.c. of milk were treated with N/2 hydrochloric acid to produce a range of acidity from —40 to +50 units. One series was inoculated with 1 c.c. of a 24 hour broth culture of *Cl. welchii Type A*, *Type B* and *Type C* respectively, and these, together with unacidified tubes for each type and two tubes of uninoculated milk were incubated in a waterbath at 37° C. for 40 minutes. Blood plate cultures were made before and after incubation. Colonies were counted after incubation of the plates for 24 hours. Three colonies from the highest concentration of acid at which growth was obtained were picked into broth and toxin from the culture submitted to serum neutralisation tests. All proved to be of the same type as the culture inoculated. Plates from uninoculated milk remained sterile. The plate counts are shown in graphs 2, 3 and 4, the axis representing the number of colonies obtained on plates made after incubation expressed as a percentage of the number obtained on plates made before incubation, and the ordinate representing the units of acidity. From the similarity of these curves to one another and to that obtained with the *Type D* strain, it appears unlikely that the types differ appreciably in their susceptibility to acid. As with the *D Type*, the reduction in viability occurs abruptly and near the point at which free acid appears.

Experiment 7.

This experiment was designed to ascertain the degree of acidity which would inhibit the proliferation of *Cl. welchii Type D* in a milk medium. Quantities of 10 c.c. of milk were acidified in series, inoculated with 1 c.c. of a 24 hour culture of *Cl. welchii Type D*, covered with 2 c.c. of sterile vaseline and placed in a waterbath at 37° C. Growth, as indicated by the appearance of gas under the vaseline seal occurred as follows—

Units of Acidity :—

—135 (*i.e.*, Unacidified Milk)	2 hours 20 minutes.
—85	2 „ 50 „
—65	4 „ 5 „
—45	Slight at 24 hours.
—35	„ 24 „
—20	None at 24 „
—10	„ 24 „
0	„ 24 „
+15	„ 24 „
+30	„ 24 „

The experiment was repeated and an essentially similar result obtained. There is, however, a tendency to variation in the point at which definite inhibition occurs, but it may be concluded that a slight retardation of growth occurs at —85 units and complete inhibition of growth at —20 units.

Experiment 8.

An attempt was made to ascertain whether pepsin influenced the effect of acidity upon viability. Eight tubes of milk were acidified to a point approaching that at which free acid could be detected. They were divided into two groups of four, and 0·1 gramme pepsin added to each tube in one group. Two from each group were inoculated with a 24-hour old broth culture and two with a 14-day old suspension of *Cl. welchii Type D*. Blood agar plates were immediately made and all tubes incubated in a waterbath at 37° C. Plates were again made after intervals of 1, 2, 3 and 4 hours. The observations were continued for a longer interval because of the possibility of an increase or decrease in the action of the acid as peptic digestion progressed. Plate counts, representing the average of two plates in each case, are recorded in Table VII (*overleaf*).

Table VII.

Inoculum.	Incubated with	Dilution.	Colony Counts on Plates from Tubes Incubated for			
			1 Hour.	2 Hours.	3 Hours.	4 Hours.
14-day-old suspension	HCl—Pepsin	1 in 20	31	32	16	3
		1 in 400	6	1	2	0·4
24 hour culture	HCl—Pepsin	1 in 20	27	21	15	16
		1 in 400	14	6	4	4
14-day-old suspension	HCl	1 in 20	36	27	23	16
		1 in 400	11	2	1	1
24 hour culture	HCl	1 in 20	31	23	10	4
		1 in 400	18	3	1	0·3

Note.—Colony counts are expressed in terms of percentage of the number observed on plates made before incubation.

There is thus no indication that the action of the acid is affected by the presence of pepsin.

Experiment 9.

The two secretions which may be expected to affect growth of the organism in the small intestine, namely trypsin and bile, were examined. The trypsin employed was a proprietary preparation; bile was obtained with sterile precautions from the gall-bladders of four lambs killed for meat and the four samples mixed. Bile was added in progressively increasing quantities to five tubes containing 10 c.c. of milk. Trypsin and the same quantities of bile were added to five further tubes. Controls with trypsin only and without trypsin or bile were included. All the tubes were inoculated with 1 c.c. of a 24 hour culture of *Cl. welchii Type D* and placed in a waterbath at 37° C. Growth was observed throughout the series after three hours and blood agar plates were inoculated with dilutions of 1 in 400, 4,000, 40,000 and 400,000. As the result was apparent from the fact that growth had commenced almost simultaneously throughout both series, tubes with intermediate dilutions of bile were omitted. The result (Table VIII) indicates that neither bile no trypsin when tested *in vitro* has any material effect upon the early growth of the organism. The m.l.d. for mice of type D toxin in the milk immediately after inoculation of the milk with the culture was ·25 c.c.; this had remained unaltered in the presence of bile but had decreased to ·05 c.c. in the absence of bile. In the presence of trypsin both with and without bile the m.l.d. had decreased to ·002 c.c., this increase in toxity, of course, being primarily due to activation of the toxin by the trypsin (Bosworth and Glover 1935). The experiment demonstrates that although bile in large quantities *in vitro* may have an inhibitory effect on the production of toxin, it has no deleterious effect upon toxin which is already present.

Table VIII

Concentration of Trypsin per cent.	Concentration of Bile per cent.	Colony Counts after 3 hours' Incubation.
0	0	450, 27, 3, 0
0	5	340, 44, 6, 0
0	12·5	340, 39, 1, 1
3	0	480, 66, 8, 0
3	5	360, 42, 2, 0
3	12·5	370, 49, 2, 0

Experiment 10.

It was considered possible that infective material subjected in the stomach to a degree of acidity insufficient to affect its viability might nevertheless become impaired in its capacity to produce toxin in the small intestine.

Twenty c.c. of milk was adjusted to contain ·60 units of acidity, inoculated with a saline suspension of *Cl. welchii Type D* and digested with pepsin for two hours. The *p*H was then readjusted to 8·0 and trypsin added. After incubation for four hours the whey was separated and was ascertained to be toxic for mice in doses of ·005 c.c.; the toxin was neutralised by type D antiserum and not by type C. The result of this experiment indicates that a degree of acidity which does not reduce the viability of the organism does not seem to impair its capacity to produce toxin in the presence of trypsin.

Experiment 11.

The capacity of *Cl. welchii Type D* to produce toxin in a milk medium in a short interval of time and over a range of H-ion concentration of from *p*H 4 to *p*H 10 was investigated.

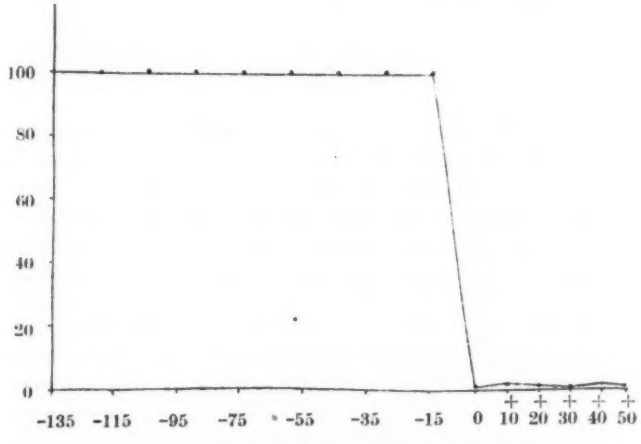
The *p*H of a series of tubes of milk was adjusted to form a series of from *p*H 4 to *p*H 10. Each was then inoculated with 1 c.c. of a toxic 24 hour broth culture of *Cl. welchii Type D*. The m.l.d. for mice immediately after addition of the culture was ·25 c.c. throughout the

series. The tubes were then incubated in a waterbath at 37° C. for 3½ hours and the m.l.d. again determined. At *p*H 4 and *p*H 5 the toxicity remained unaltered. At *p*H 6 the m.l.d. was 0·1 c.c. at *p*H 7 and *p*H 8 it was ·05 c.c., and at *p*H 10 it was 0·1 c.c. There is thus some evidence of increase in toxicity from *p*H 6 to *p*H 10. This experiment was repeated, but centrifuged toxin-free bacteria were used as the inoculum; toxin production was again demonstrated to the same degree. This experiment demonstrates the early development of toxin in a milk medium between *p*H 6 and *p*H 10.

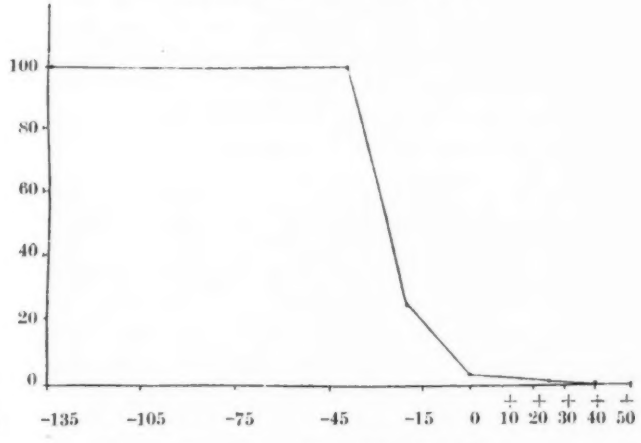
Summary of Results of "in vitro" Experiments

When hydrochloric acid is added to milk and the resulting acidity of the medium is measured in terms of the amount of N/10 acid required to procure evidence of the presence of free acid (−quantities) or of the amount of N/10 alkali required to neutralise the free acid present (+quantities) it is found that, near the point at which free acid can be shown to be present, the medium has a well defined effect upon the viability of *Cl. welchii* organisms of types A, B, C and D. This effect consists of a reduction to at least 1 per cent. of the numbers of viable organisms present in the medium (Experiments 1 and 6). It is also shown that in a medium containing +50 units of free acid the viability of *Cl. welchii Type D* is so reduced within five minutes of contact with the medium. In Experiments 4 and 5 it is shown that when the total amount of acid in the medium is constant, the effect of acid on viability is inversely proportional to the amount of casein in the medium. Neither an increase nor decrease in the action of acid on viability could be shown when pepsin was included in the medium. The viability of a 14-day old suspension and of a 24-hour culture of the same

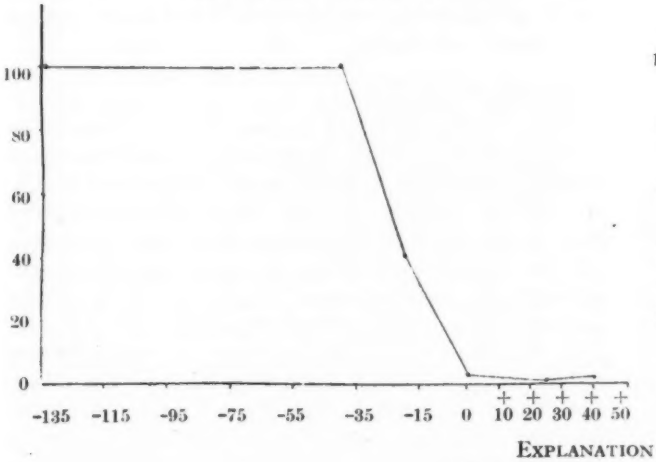
Graph 1.—*Cl. welchii Type D.*



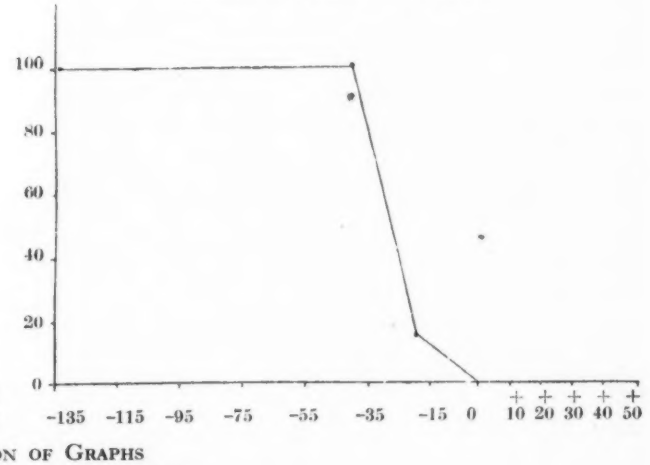
Graph 2.—*Cl. welchii Type A.*



Graph 3.—*Cl. welchii Type B.*



Graph 4.—*Cl. welchii Type C.*



Explanation of Graphs

The Effect of Acidity upon Viability

The axis represents the percentage of organisms remaining viable and the ordinate the number of clinical units of free acidity, "O" denoting the first appearance of free acid. The (—) quantities represent the amount of N/10 acid required to procure the appearance of free acid in 100 c.c. of the medium, and the (+) quantities the amount of N/10 NaOH required to neutralise the free acid present in 100 c.c.

strain of *Cl. welchii Type D* were both affected to the same extent, but heat and age resistant forms from a three-month-old culture appeared to be affected by a lower concentration of acid than the younger cultures. In Experiment 7 a slight growth-retarding influence was demonstrated with −85 units of acidity, marked inhibition with −45 units and complete inhibition with −20 units. It is shown in Experiment 10 that the capacity of *Cl. welchii Type D* to produce toxin remains unimpaired after incubation in a medium with —60 units of acid, toxin being easily demonstrable with the aid of trypsin within four hours of readjusting the medium to *p*H 8. In Experiment 11 it was shown that *Cl. welchii Type D* could produce a demonstrable quantity of toxin in a milk medium of from *p*H 6 to *p*H 10 within 3½ hours. Bile, even in high concentration, was not shown to inhibit the growth of the organism or to have any deleterious effect upon Type D toxin already present in the medium (Experiment 9). When, at various stages in the above experiments, colonies were examined, they were found to be of the same type as the culture used in the experiment.

IN VIVO EXPERIMENTS

Experiment 12.

It became apparent from the results of the above *in vitro* experiments that gastric acidity may have an important influence upon the fate of *Cl. welchii* in the alimentary tract. It was therefore desirable to determine the gastric acidity in the normally feeding lamb, but as it is not within the scope of this work to investigate the physiology of gastric digestion, a few brief observations only were made. A seven-day-old lamb was separted from its dam for an interval of five hours and was then allowed to feed until the stomach could be palpated. Samples of gastric contents were withdrawn and their free acid content determined (Feed 1, Table X). This was repeated on the following day but the lamb was allowed to feed until it could obtain no more milk from the udder. The expectation that a very large feed would be taken was not fulfilled but the feed taken was larger than that allowed on the previous day. Samples of the gastric contents were again examined (Feed 2, Table X). The lamb was then artificially fed for one day on milk made up to approximate ewe's milk in composition, employing dried skimmed milk, casein and cod liver oil. On the following morning, food having been withheld for 16 hours, a very large feed of the artificial milk, namely 800 c.c., was given. This resulted in a very marked distension of the abdomen. Samples of abomasum contents were examined at intervals. (Feed 3, Table X.) A similar experiment was carried out in a four-week-old lamb which had commenced to feed on grass, a quantity of 1,400 c.c. of the adjusted milk referred to above being fed by stomach tube and samples of stomach contents examined at intervals up to five-and-a-half hours (Feed 4, Table X). Difficulty was experienced in obtaining the samples, more especially as the abomasum emptied, and the results, shown in Table X, are therefore incomplete. The feeds are recorded in the table as 1, 2, 3 and 4 in the order in which they are referred to above.

Table X

Interval after Feeding.	Feed 1.	Feed 2.	Feed 3.	Feed 4.
	Units.	Units.	Units.	Units.
5 minutes	—50		—185	
15 „		—90		
20 „	—80		—260	—120
30 „		—55		
45 „		—60		—150
1 hour		—60		
1 „ 20 mins.				—112
2 hours	—35	—75		—105
3 „			—100	—115
5½ „				—50

The decrease in free acid between 5 minutes and 20 minutes in the case of feeds 1 and 3 is probably due to the fact that at the first observation at 5 minutes insufficient time had elapsed for the binding of the acid to the casein, this resulting in a higher acid reading. The experiments show that the acidity present during the three hours following the ingestion of a large feed is, according to the results of Experiment 7, insufficient to inhibit the growth of *Cl. welchii Type D*, and that according to Experiments 1 and 6, after a small feed the degree of acidity in the abomasum is insufficient to affect the viability of *Cl. welchii* within two hours of feeding.

Experiment 13.

Two lambs received respectively a small and a large feed of milk containing a suspension of barium sulphate. Both were submitted to X-ray examination. In the lamb which received the large feed the pylorus and the first part of the duodenum were obscured by the large amount of radio-opaque material in the abomasum, but when observed after 15 minutes the barium was visible over a considerable extent of the small intestine. The small feed contained unheated barium sulphate and the barium therefore sedimented rapidly on reaching the abomasum. This enabled the duodenum to be seen through the upper parts of the contents of the abomasum. The lamb was observed during feeding and the pylorus was seen to open and radio-opaque material to pass

through as the feed entered the abomasum. Fig. 1 was taken five minutes after commencement of feeding. It shows the feed passing through the pylorus and barium in loops of small intestine is visible through the abomasum. Ten minutes later radio-opaque material was present over a large part of the small intestine (Fig. 2). The only feature of interest in later observations was the marked retardation in the emptying of the abomasum after the first two to three hours following feeding. It is thus apparent that infective material may pass through the pylorus with a minimum of contact with gastric secretions.

Experiment 14.

From the results of the foregoing experiments it was argued that there were two possible explanations of the phenomenon of entero-toxaemia, namely (1) that the organisms were able to pass through the abomasum and to proliferate in the small intestine, and (2) that some proliferation occurred in the abomasum. It appeared probable that the only hindrance to the passage of viable organisms into the small intestine, namely, the acidity of the abomasum, could be removed by including a carbonate in the feed; growth in the abomasum and passage of the organisms into the small intestine would be facilitated by a large feed of milk rich in casein. Lambs 1 and 2 were employed for the test with casein and lambs 3 and 4 for the carbonate. Lamb 5 was employed to confirm the results obtained with lambs 1 and 2.

Lamb 1.—This lamb was removed from its dam at birth and fed by hand on "adjusted milk." (60 c.c. skimmed milk powder, 12 grammes casein, 7·5 c.c. cod liver oil and 600 c.c. water). When seven days old, as the first feed in the morning, it voluntarily drank a large feed (600 c.c.) of the same milk in which was suspended the centrifuged bacterial growth from 120 c.c. of a 24 hour culture of *Cl. welchii Type D*. Samples of abomasum contents were removed 5 minutes, 20 minutes and 3 hours after feeding and inoculated in dilutions of 1 in 20, 1 in 200 and 1 in 2,000 on blood agar plates. The numbers of colonies obtained from the 5 minute and 20 minute samples were each equal to 66 per cent. of the number in the suspension before feeding. At 3 hours the sample was charged with gas and the number of colonies was more than 10 times greater than at 20 minutes. At this time the contents were toxic for mice, and the toxic element was shown by serum neutralisation tests to be *Cl. welchii Type D* toxin. The m.l.d. for mice was ·05 c.c.

Up to this time the lamb had shown no symptoms of discomfort other than would be expected to follow the consumption of a large feed, but from three to four hours after the feed unmistakable symptoms were observed. The lamb was inclined to stand in one position, showing a preference for a position where it could lean slightly against a wall. It moved unsteadily and occasionally exhibited a symptom which is thought to be characteristic; the head gradually drooped in short spasms giving an impression of sleepiness but would then be jerked up as if in a voluntary effort to retain consciousness. From four to five hours after feeding it fell on several occasions as if suffering from a brief temporary paralysis of the hind limbs, but was able to stand when placed on its feet. It was found dead 5½ hours after the feed, death having occurred in 5 to 5½ hours.

At a *post-mortem* examination carried out immediately, the abomasum was found to be distended with gas and to contain 250 c.c. of a suspension of milk clot in whey. The mucosa was normal except for small round pinkish areas marking the point of entry of the needle used to remove samples during life. The rumen contained 60 c.c. of whey with a few milk clots. The mucosa of the small intestine was congested but no structural abnormality was noted. The kidneys were normal in colour but presented a "bulging" appearance on section. The pericardial sac was distended with a clear watery fluid.

Smears made from the abomasum and rumen and at different points in the small intestine showed masses of *Cl. welchii*-like organisms. Heart-blood smears were negative. Cultures from the abomasum, small intestines and heart-blood gave pure growths of *Cl. welchii*.

The m.l.d. of filtered abomasum contents for mice was ·0005 c.c. The filtrate was examined to determine whether the toxicity was due to toxin acting alone or to toxin in an activated condition. [It is known that when *Cl. welchii Type D* toxin is activated by trypsin, the increase in toxity is due to a greater lethal action and not to an actual increase in the amount of toxin. Therefore, the amount of true toxin present in a solution, in which toxin is present in an activated state, may be estimated by determining the amount of specific serum of known titre required to neutralise a given amount of the solution (Bosworth and Glover 1935)] It was established that 10 times more of this toxin could be neutralised by a type D serum of known titre than could be anticipated. That is, the m.l.d. of true toxin present was ·005 c.c. The m.l d. of filtered intestinal contents was ·00005 c.c. but this was found to be activated to the extent of 80 times, thus making the m.l.d. of true toxin present ·004 c.c.

The sugar content of the blood taken from the posterior vena cava after death was abnormally high, namely ·253 per cent.

Lamb 2.—This lamb was two days older but was treated in a manner similar to Lamb 1, except that the removal of gastric content was omitted. The disease ran a course exactly similar to that in the first lamb and death occurred 5¼ hours after feeding. The animal's collapse was sudden and it remained recumbent with the head drawn back until death. While recumbent there occurred three spasms of muscular contraction and hyperaesthesia, during which the head was drawn back. The symptoms observed strongly resembled those shown in natural cases of pulpy-kidney disease.

The *post-mortem* examination was carried out immediately after death. Gross lesions were essentially similar to those described in Lamb 1.

Smears differed from those in Lamb 1. In the stomach the number of *Cl. welchii* forms was sufficient to yield a naked-eye tint with Gram staining. Smears from the first and second parts of the small intestine were almost negative, but about a hundred *Cl. welchii*-like organisms per field were observed in the last third. In the caecum smears the organisms were present in masses, with a preponderance of clostridial forms. Smears from heart blood and muscle were negative.

Cultures from the abomasum, small intestine, caecum and heart blood yielded rich growths of *Cl. welchii*. Blood samples taken at the commencement of the experiment and at the moment of death, from the jugular vein, showed a rise in the blood sugar from ·120 per cent. to ·167 per cent. Urine taken before feeding was negative for sugar and a sample obtained two hours after feeding was strongly positive.*

The presence of type D toxin was demonstrated in the abomasum, small intestine and caecum. The m.l.d. of the abomasum contents for mice was ·005 c.c., the degree of activation was ×8 and the m.l.d. of true toxin was therefore ·04 c.c. In the small intestine the m.l.d. was ·0005, activation was ×40, and the m.l.d. of true toxin was therefore ·02. The m.l.d. of the caecal contents was ·00005, activation was ×250, and the true m.l.d. was therefore ·0125.

An interesting observation was made during the course of the study of the toxins in this lamb, namely, that when intestinal contents containing activated toxin were stored over night, the amount of true toxin remained almost unaltered while the actual m.l.d. of the material decreased, so that evidence of activation was almost absent.

Death was not observed in Lamb 1, but in Lamb 2 it was possible to remove material for the preparation of sections within three minutes of death. Owing to the controversial nature of present knowledge of histo-pathology in naturally occurring pulpy-kidney disease considerable interest is attached to the findings in this case, in which death was undoubtedly caused by a toxin produced in the alimentary tract. The abomasum, duodenum, jejunum, ileum, pancreas and kidney, were examined. These sections were apparently normal except those of the kidney. In the kidney there was no evidence of any glomerular damage. The state of the tubule epithelium showed some degree of cloudy swelling but it could not be concluded that any specific structual change had occurred. In a field investigation carried out by the writer in 1937, *post-mortem* examinations were carried out upon 15 lambs which, after identification of Type D toxin in the alimentary tract and, in eight cases, the isolation of *Cl. welchii Type D* from the contents of the small intestine, were deemed to have died of pulpy-kidney disease. Twelve of these had been found dead and three were examined in a fresh state. The ages of the lambs varied from one day to four weeks. Only one of these lambs showed any distinct abnormality in the consistency of the kidneys and this lamb was one of those found dead. Furthermore, of four cases in which it was not possible to demonstrate the toxin or the organism, one exhibited a typical pulpy kidney. Therefore, in spite of the early association of the pulpy lesion of the kidney with the disease, it appears doubtful that a specific lesion of the kidney is consistently associated with death from *Cl. welchii Type D* toxaemia.

Lambs 3 *and* 4.—Two one-week-old lambs were removed from their dams and fed with 100 c.c. of "adjusted milk," magnesium carbonate, and centrifuged bacteria from 120 c.c. of a broth culture of *Cl. welchii Type D*. The amount of carbonate was calculated as the weight necessary to neutralise that amount of hydrochloric acid which would saturate the casein in the 100 c.c. feed. Thus, assuming that the abomasum mucosa could produce sufficient acid to bring the contents to the free acid point, the amount of carbonate given would neutralise the whole of this. There is, therefore, no reason to suppose that the bacteria would be adversely affected in their passage through the abomasum. These lambs remained normal.

Lamb 5.—This lamb was four weeks old and 1,600 c.c. of "adjusted milk" and the centrifuged bacteria from 120 c.c. of a broth culture of *Cl. welchii Type D* were fed by stomach tube. Abundance of gas could be palpated in the abomasum three hours later, and ten hours after the feed the lamb was in a collapsed state. Death occurred in the night. *Cl. welchii Type D* toxin was demonstrated in the contents of the

*Glycosuria has been noted in a lamb given a large feed of the milk without bacteria.

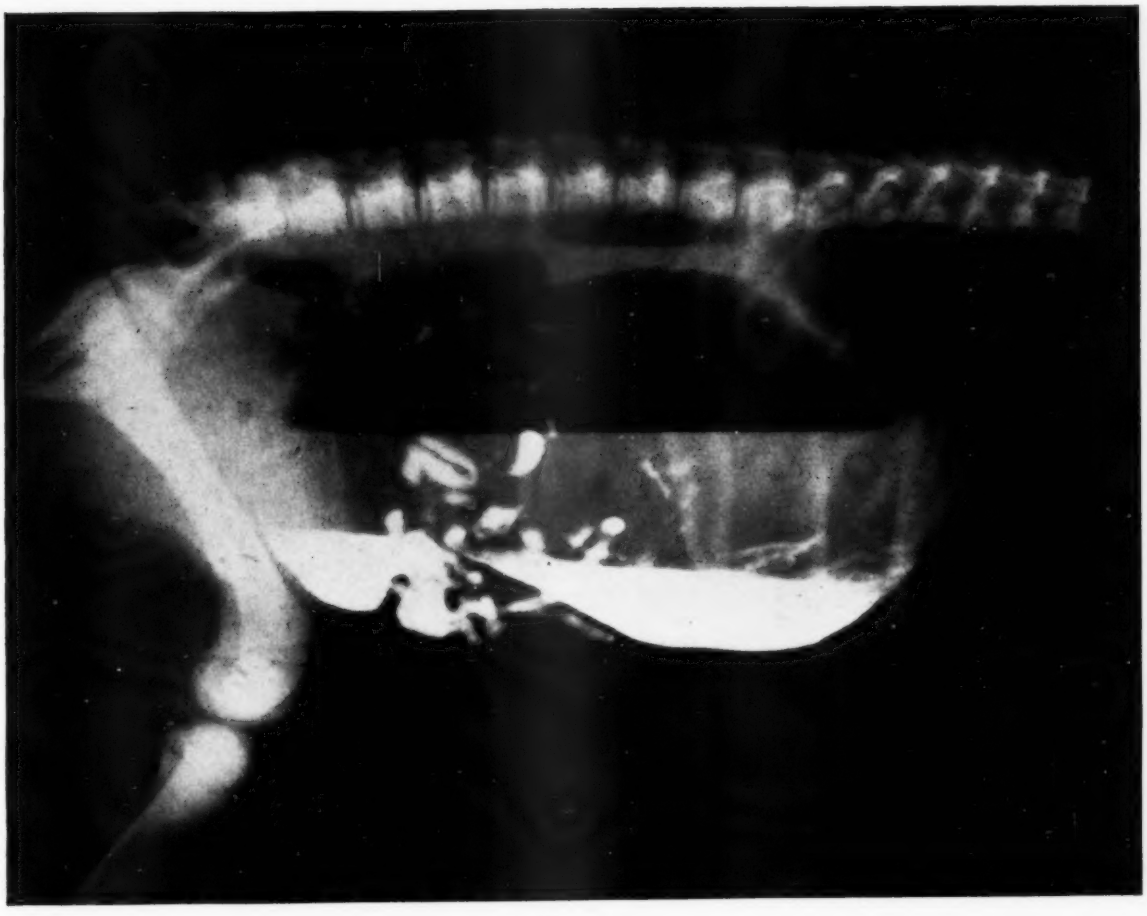


FIG. 1.

FIG. 2.

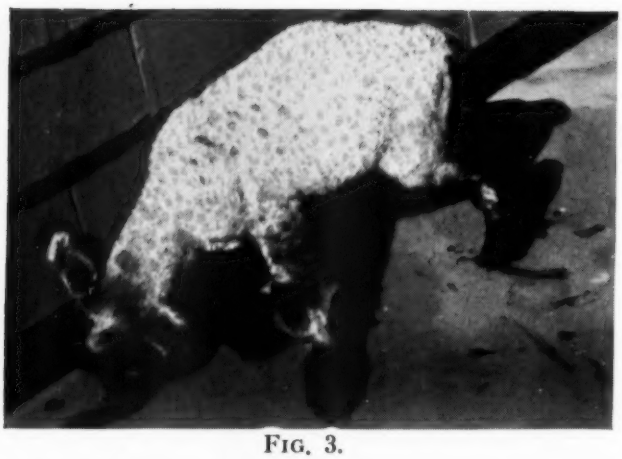


FIG. 3.

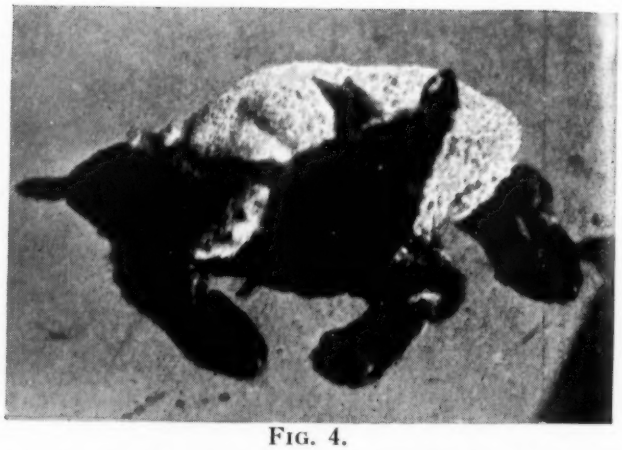


FIG. 4.

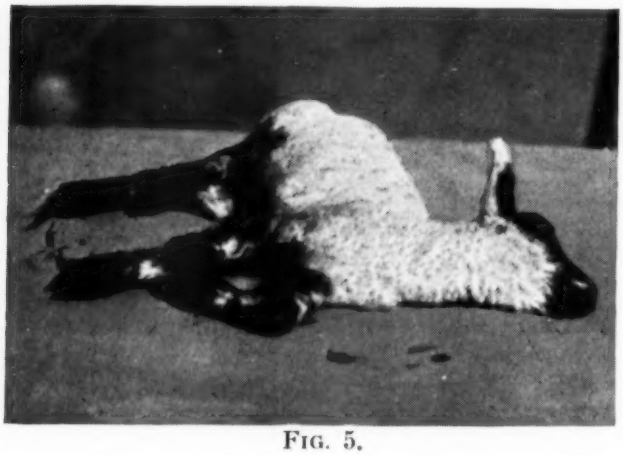


FIG. 5.

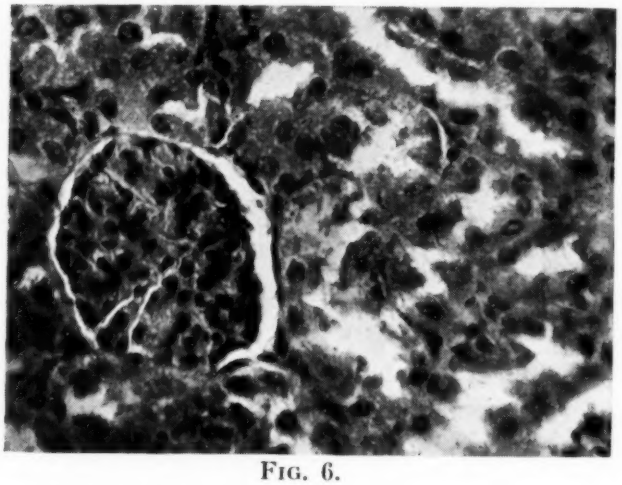


FIG. 6.

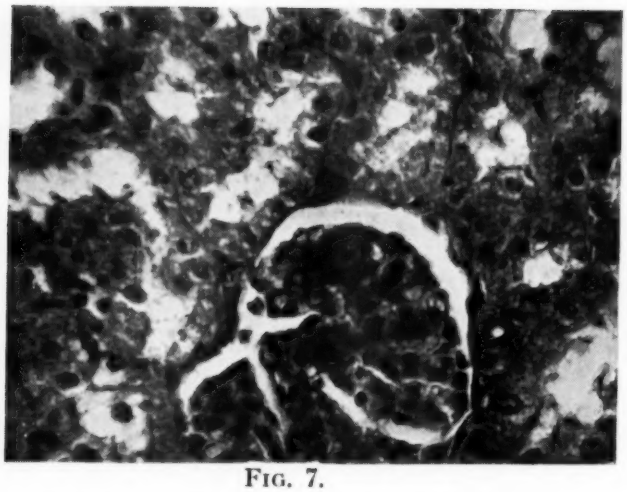


FIG. 7.

FIG. 8.

EXPLANATION OF FIGURES

1. Radiograph taken 5 minutes after commencement of feeding, demonstrating the passage of the barium suspension through the pylorus and its presence in the small intestine.

2. Radiograph taken 15 minutes after commencement of feeding, showing diffusion of the barium in the small intestine.

3, 4, 5. An experimental lamb which was fed with the bacterial growth from 120 c.c. of broth culture of *Cl. welchii type D* and 600 c.c. of milk adjusted to the composition of ewe's milk. Photographs taken from 4 to 4½ hours after feeding. Photograph (3) shows the lamb's inability to remain standing without support. Photograph (4) shows the intense sleepiness which appears when the lamb is undisturbed. Photograph (5) was taken during a convulsive spasm a few minutes before death.

6. Microphotograph of a section from the kidney of Experimental Lamb 2, showing the normal glomerulus and slight disintegration of the epithelial cells of the convoluted tubules. Kidney placed in fixative solution within three minutes of death.

7. Microphotograph of a section from the kidney of a lamb dead of pulpy kidney disease, showing changes similar to those seen in (6). Kidney placed in fixative solution within three minutes of death.

8. Subendocardial haemorrhage in right ventricle of experimental lamb which died following feeding of *Cl. welchii type D* organisms in a large feed of enriched milk.

abomasum and small intestine. As there was no evidence to indicate the time at which death had occurred further examination was not undertaken. The death of this lamb is therefore of interest only in that its age corresponded to that at which lambs commonly develop the disease under natural conditions.

The results of this experiment may be summarised as follows: Lambs 1 and 2, given a large feed of "adjusted milk" and culture developed an acute illness and died within five-and-a-half hours, but Lambs 3 and 4, in which the acidity of the gastric secretion was neutralised by feeding a carbonate, failed to show symptoms of illness though fed in the same way and with the same amount of culture. Lamb 5, a four-week-old lamb, which received the same treatment as Lamb 2, became ill and died. In the case of Lamb 1, samples removed from the abomasum two to two-and-a-half hours before death were shown to contain *Cl. welchii Type D* toxin, and it was shown that at this time the bacterial count of the contents was at least ten times greater than in a sample removed 20 minutes after feeding the culture, or two hours 40 minutes earlier. In *post-mortem* examination of Lambs 1 and 2, *Cl. welchii Type D* toxin was demonstrated in the abomasum and small intestine; by measuring toxicity in terms of true toxin, using a specific serum of known titre, it was shown that the amount of toxin in the small intestine was less than that in the abomasum in one lamb, and greater in the other. The differences were not significant in either case. The symptoms and lesions in these two lambs were similar to those observed in natural cases of pulpy-kidney disease.

DISCUSSION

Since organisms of the *Cl. welchii* group have been accepted as the cause of various entero-toxaemic diseases of sheep the assumption made by Bennetts (1932) that entero-toxaemia followed rapid multiplication of the organisms within the small intestine has remained unchallenged. So tacit has this assumption been that it is difficult to find in the literature any reference to a search for specific toxin in any part of the alimentary tract other than in the contents of the small intestine. McEwen and Roberts (1931) give details of the examination of the abomasum and intestinal contents for toxin in five natural cases of entero-toxaemia in adult sheep (*Cl. welchii Type C*). The following extract from their table is of interest. The test animals used for the toxin estimations were rabbits.

Case 49.						
5 c.c.	abomasum contents	—	6 c.c.	intestinal contents	+	
Case 53.						
10 c.c.	„ „	—	5 c.c.	„ „	—	
Case 54.						
3 c.c.	„ „	+	5 c.c.	„ „	—	
Case 57.						
10 c.c.	„ „	—	Not markedly toxic.			
Case 58.						
Not tested.			5 c.c.	intestinal contents	—	

There is here as much evidence of the presence of toxin in the abomasum as in the small intestine. Dalling (personal communication relating to work awaiting publication) states that *Cl. welchii Type D* was demonstrated in the abomasum contents of a number of lambs affected with lamb dysentery from the intestinal contents of which *Cl. welchii Type B* could be isolated. In the course of the field investigation in 1937 the author encountered two cases of pulpy-kidney disease in young lambs in which *Cl. welchii Type D* toxin was demonstrable in high concentration in the rumen contents. These were the only two cases in which a search was made at any site other than the small and large intestine.

The view formed by Bennetts (1932) in connection with entero-toxaemia of adult sheep was that "under normal conditions the sterilising action of the acid secretion of the abomasum and the more or less rapid passage of the ingesta through the small bowel prevent the prolIferation of *B. ovitoxicus* . . ." It is probable that this assumption of a bactericidal

degree of acidity in the abomasum has deterred other workers from carrying out tests on abomasum contents in natural cases of enterotoxaemia in lambs and adult sheep. It is shown in Experiments 1, 2, 3, 5 and 6, that the viability of *Cl. welchii Type D* is unaffected by acid in the presence of a sufficient amount of casein to combine with the HCl as a hydrochloride, and that viability is affected abruptly as the point of saturation in the reaction between casein and HCl is approached. (Graph. 1.) These *in vitro* experiments were carried out with cow's milk, containing 2·9 per cent. of casein, while ewe's milk contains 4·2 per cent. A still greater neutralising action can, therefore, be expected with ewe's milk. In the observations described in Experiment 12 it is seen that not in one instance did the acidity of the abomasum rise above −35 units within the first two hours after feeding and it was generally lower even after small feeds. In Experiment 13 it was shown by X-ray photographs that in two lambs fed on milk the passage of food out of the abomasum occurred almost simultaneously with the commencement of feeding. Thus it is shown by *in vitro* experiments that *Cl. welchii Type D* may remain unaffected for 40 minutes in the presence of −15 units of acidity, while in the abomasum bacteria may not encounter an acidity of more than −35 units and may pass into the intestine in less than five minutes. It is, therefore, unlikely that *Cl. welchii Type D* can be materially affected by acidity during its passage through the abomasum. It is further shown in Experiment 10 that organisms which have been in contact with combined acid remain capable of toxin production. It could not be demonstrated that bile in high concentration *in vitro* had any serious deleterious effect upon the toxin or on proliferation, while it is known that Type D toxin is activated to a considerable extent in the small intestine (Bosworth and Glover, 1935). It is shown that toxin is produced in milk over a wide range of H-ion concentration and that it remains unaffected over a still wider range (Experiment 11). Thus, *in vitro* experiments indicate that over a wide range of "normal" conditions *Cl. welchii Type D* can arrive in the small intestine with unimpaired viability. If it is assumed that pulpy-kidney disease is a result of proliferation of the organism in the small intestine it is, therefore, difficult to explain why all lambs grazing on an infected pasture do not succumb to pulpy-kidney disease, and why animals become susceptible for a brief interval and under certain conditions of grazing. Further, the consistent failure to induce the disease by oral administration of culture, *e.g.*, Gill (1933) and Experiment 14 above, remain unexplained. It is, in fact, almost impossible to reconcile our knowledge concerning any of the enterotoxaemias with a theory of causation by chance infection followed by proliferation in the small intestine.

In a milk medium with −85 units of free acid *Cl. welchii Type D* may commence to grow almost as rapidly as in unacidified milk (Experiment 7). In two observations in Experiment 12 the acidity remained below this figure for at least three hours in lambs which had been given a large feed. The facts observed point to the possibility that in an animal which has eaten a large meal *Cl. welchii Type D* can proliferate in the abdomasum over a period of at least three hours and that a steady current, gradually increasing in bacterial content and in toxicity, may flow through the pylorus. There is ample evidence that in the small intestine the lethal action of the toxin may be increased even if proliferation is not continued there. This possibility was investigated in Experiment 14. Two lambs given a large feed of milk, adjusted to the composition of ewe's milk, and containing a suspension of bacteria centrifuged from a broth culture, died in five to five-and-a-half and in five-and-a-quarter hours respectively. The disease ran a similar course in both lambs. In one, samples were removed from the abomasum from time to time and it was established that a tenfold proliferation had occurred in the abomasum in three hours and that toxin was even then present. At *post-mortem* examination in both lambs the toxin was estimated in the abomasum and small intestine and the amount of specific serum necessary to neutralise the toxin ascertained. It was found that the amount of toxin in the intestinal contents, when activation was discounted, was slightly in excess of that in the abomasum in one lamb and slightly less in the other. The difference was in each case within the limits of experimental error. Sugar appeared in the urine and an increased sugar content was demonstrated in the blood of lamb. This is in accordance with the results of Stewart (1929), but our observations in a control lamb which was given a large feed without bacteria suggested that this might be related to the quantity of milk ingested rather than to the toxic process. This is further suggested by the appearance of glycosuria two hours after feeding in one of the lambs which died.

From the results of the experimental work recorded here it is possible to advance an opinion relating to the probable behaviour of *Cl. welchii Type D* organisms after their ingestion by a milk-fed lamb. If the organisms are ingested when the abomasum is almost empty, or with a small feed of milk, the abomasum contents attain a growth-inhibitive degree of acidity before the organisms can become established. In the meantime some of the ingested

organisms pass into the small intestine but owing to the rapidity of the passage of ingesta through this organ, as observed by X-ray examination, it is improbable that toxin can be formed there. The highest degree of acidity which the abomasum contents of the lamb may attain on partial emptying is not known and it is, therefore, not possible to form an opinion of the eventual fate of organisms which may remain with the food residum in the abomasum. If, however, the infective material is ingested with a large feed or a large feed is taken when the residuum in the abomasum contains infective material, the acidity of the abomasum contents may remain sufficiently low for a period of time to allow the organism to grow. It is obvious that the greater the number of viable organisms present the greater is the probability that growth will occur. It is, therefore, necessary to bear in mind the possibility of a gradual accumulation of infective material in the abomasum in a lamb which, by constant feeding, has maintained a low degree of acidity in its abomasum over a prolonged period. The deciding factors in the production of the disease would appear to be the presence of a sufficiently large inoculum of *Cl. welchii Type D* in the abomasum and sufficient milk to maintain the acidity at a level at which the organisms can proliferate.

Summary

(1) When the acidity of a milk medium is expressed in terms of units of free acid, "O" being the point of appearance of free acid, the behaviour of *Cl. welchii Type D* in the medium may be summarised as follows:—

With −85 units of free acidity the commencement of growth is slightly retarded.

With −45 units growth is markedly inhibited.

With −20 units growth is entirely inhibited.

At a point between −20 and +20 units the viability of the organisms is reduced to 1 per cent. or less.

(2) The effect of a constant amount of acid upon the viability of the organisms is inversely proportional to the amount of casein in the medium.

(3) Acidity has a similar effect upon the viability of *Cl. welchii Type A, Type B and Type C.*

(4) In three-and-a-half hours a demonstrable amount of toxin is produced by *Cl. welchii Type D* in a milk medium within the limits of *p*H 6 and *p*H 10.

(5) After ingestion of a large feed of milk the free acidity of the abomasum contents of a lamb may remain below −100 units for three hours after feeding. After ingestion of a small feed the free acidity may rise to −35 units within two hours.

(6) X-ray observation demonstrates that in the young lamb the ingesta pass through the pylorus almost immediately after the commencement of feeding.

(7) No evidence could be obtained to show any greater resistance to the effects of acidity in heat-resistant and age-resistant cultures of *Cl. welchii Type D.*

(8) *In vitro* experiments failed to demonstrate any deleterious effect of bile upon the toxin of *Cl. welchii Type D.*

(9) A disease closely resembling naturally occurring pulpy-kidney disease has, in the author's opinion, been produced in lambs by feeding toxin-free *Cl. welchii Type D* bacteria in conjunction with a large feed of milk adjusted to the composition of sheep's milk. The normality of the abomasal and intestinal mucosae and the absence of specific lesions in the kidneys were notable features in the *post-mortem* examination of one lamb which was examined immediately after death. Glycosuria was noted in a lamb two hours after feeding and also in a normal lamb which had received a large feed only; this suggests that a large feed alone may play a part in causing the glycosuria associated with pulpy-kidney disease. The fact that the amount of true toxin present in the small intestine in two of the above lambs was not significantly greater than that in the abomasum suggests the possibility that toxin production in the small intestine may not be an essential feature of pulpy-kidney disease.

(10) It is suggested that the mechanism by which entero-toxaemia is produced in milk-fed lambs may be as follows:—

When infective material is present in the abomasum after the ingestion of an abnormally large feed, the casein in the feed renders the acid secretion of the abomasum inert for a sufficient time to allow *Cl. welchii Type D* to proliferate in the abomasum and to produce a toxin. Progressively increasing numbers of organisms pass out and the chyme becomes progressively more toxic. The toxin is activated in the small intestine and it is possible that there is further proliferation and toxin production as the ingesta traverse the small intestine.

Acknowledgements

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PRACTICAL VETERINARY TRAINING IN GERMANY

We publish below extracts from information given in a recent issue of *Deutsche Tierärztliche Wochenschrift* (1938. No. 12. pp. 184-185), regarding the new regulations dealing with the education of veterinary surgeons which were issued by the Minister of the Interior on February 16th, 1938, not only because they make interesting reading, but because they invite comparison with the arrangements made in this country for the provision of such practical training.

The following courses are prescribed for practical training:—

(1) A period of two months to be spent on a farm. This is wherever possible to take place during the first summer vacation. Trained agriculturists alone will be exempt from the course. Arrangements in the hands of the Veterinary Advisory Boards.

(2) Three months to be spent at a school under veterinary supervision. This course to be taken during the summer vacation prior to the period of clinical instruction. Problems dealing with nutrition, hygiene, breeding and clinical medicine will be studied. (At present there are three such schools in Germany, under the direction of the Rector of the University and two members of the Senate—at Adendorf near Hannover, Klein-Ziethen, near Berlin, and Zargenthin in Pomerania.)

(3) Course in Meat Inspection lasting three months, held during the last summer vacation before the final examination.

(4) A six-months' course as assistant to an approved experienced practitioner (Praktikantenzeit) at the conclusion of the student's period of training.

Some Local Sheep Disease Problems*

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For the last few years I have been fortunate in being fairly intimately connected with diseases of sheep as they occur in North Wales. When, therefore, our Secretary asked me to present a paper at this meeting it struck me, this being the season of the year when sheep losses are particularly prevalent, that a few remarks on some local sheep diseases might not be amiss.

In the course of my short professional career I have often recalled with a sense of some astonishment what a scarcity of information on the diseases of sheep, in particular, was imparted to us in College. I can hardly think that this was because of the seeming enonomic unimportance of this animal, or because certain diseases present among flocks to-day were then unknown; thus one is forced to the conclusion that much of our present-day knowledge of sheep diseases is the outcome of the last nine to twelve years of research.

The attention of most workers into disease problems has been focussed on methods of prevention and cure. This to a certain extent seems inevitable. Unfortunately, however, this fact has resulted in the flooding of the market with various remedies, particularly vaccines and sera, which claim the ability to prevent or cure this or that disease in many cases before the true aetiology of a disease is definitely known.

Anaerobic Diseases of Sheep

There can be no doubt, I think, that the work done on diseases caused by certain anaerobic bacteria must hold the first place in importance in research into sheep diseases in general. It must at the same time be a lasting tribute to men such as Dalling, McEwen and the late Professor Gaiger in this country; Bennetts, Turner, Gill and Oxer in Australia and New Zealand, the majority of whom have been directly or indirectly the means of saving the lives of innumerable sheep and the fortunes of many individuals.

The anaerobes, being as a class particularly prone to soil habitat, seem to choose sheep as their natural prey, and it is still an open question as to whether or not the so-called pathogenic anaerobes may not under normal circumstances live merely a parasitic life in the bodies of their hosts. What determines that the

*Presented to the North Wales Division, N.V.M.A., at Rhyl, March 4th, 1938.

harmless parasite shall change into a most virulent pathogen in possibly a very short space of time is still a mystery. Many theories have been advanced to explain this, some of which appear to fit the case in some instances, while being totally inadequate to explain it in others. As is well known, these pathogenic anaerobes depend upon the production of a soluble exotoxin for their lethal action. This highly important characteristic makes it unnecessary for them to invade the body generally in order to cause death. Conversely, they choose a certain focus, in which, under suitable conditions still not definitely known—they rapidly multiply and in so doing produce their toxins which become absorbed into the circulating blood stream, later becoming fixed to some vital tissue. It is another important and interesting fact that the toxins produced are highly specific and while fatal in certain doses can and do act as extraordinarily efficient antigens in sub-lethal doses. Hence the comparative ease with which the diseases set up by these organisms can be prevented by active or passive immunisation.

The potency of these toxins is clearly illustrated by the lack of premonitory symptoms in the animals affected. The general history is that of sudden death but does not exclude the appearance of an occasional, loosely defined, "chronic" case. The seasonal and local variation in the natural occurrence of these diseases is striking. One hears of a "braxy area" or a "braxy season" although the latter may vary considerably in different parts of the country. One knows that about 98 per cent. of cases of "strike" in sheep occur in spring months. You note that I leave about 2 per cent. to occur at other periods, believing that this condition can occur at any time of the year and further, may occur in any age of sheep from lambs of a few days to three to four years old ewes.

The local distribution of these diseases is also particularly interesting. In investigating losses attributed to "strike" it is common to learn that they may be confined to as small an area as a particular field on a farm. Close questioning or examination of the field in question elicits the fact that the field is one upon which a particularly early growth of young grass occurs following a heavy manuring. On the other hand, one finds it difficult to explain why one farm can escape the ravages of lamb dysentery when surrounded by farms suffering appalling losses from the disease.

The type of animal affected in most cases of anaerobic disease of sheep is, almost without exception, the best conditioned. In passing, it is interesting to realise that in all probability the success sometimes attributed to the old shepherd's custom of bleeding or docking as a means of prevention or cure can be related in part to the certain amount of retardation such treatment occasions. It is really remarkable how little checking is apparently necessary to prevent subsequent losses. On more than one occasion when running field trials it has been our misfortune to have had our experiment ruined by the absence of mortality among the control lambs where for years previously, losses have been regularly encountered. Rightly or wrongly, we have attributed such misfortune to the penning of the lambs during the period of inoculations. This has led one seriously to think that "exercising" might indeed be found a practical means of preventing losses from so-called strike of ewes or pulpy kidney in lambs.

Treating the diseases more specifically, one might commence by saying that braxy—first described and successfully investigated by Gaiger in Scotland—does occur in certain parts of North Wales. A "sudden death" disease of yearlings, occurring in the first or last few months of the year (depending on locality) and frequently associated with frosty mornings, it is commonly referred to as "clwy coch." As a result of a number of field trials we are convinced that losses can be reduced considerably by the inoculation of the susceptible sheep about three weeks before the actual clwy coch season, with 5 c.c. of *Vibrion septique* anaculture. It is very possible that some of you have had experience of this in your respective practices. *Vibrion septique*, the causal organism, appears to choose the wall of the fourth stomach, less frequently the duodenum, as its seat of operation. Here it multiplies rapidly, causing inflammation followed by necrosis of a large area of the mucous membrane—the most outstanding and probably the diagnostic lesion to be found on *post-mortem* examination. As an exception to the rule *Vibrion septique* produces its toxin while invading the blood stream.

Between this disease and a class to which I shall refer as the enterotoxaemias, might for convenience be placed lamb dysentery, although some work done has convinced us that this disease is also an enterotoxaemia. Despite the fact that lamb dysentery is characterised most frequently by the typical ulcer formation of the wall of the small intestine, a form of the disease which may be referred to as a typical lamb dysentery does occur where no such discrete ulceration, necrosis or gassing of the wall is evident and in fact, apart from some inflammation, the mucous membrane remains apparently intact. This leads me to say that a final diagnosis of the absense of lamb dysentery can only result from a detailed laboratory examination of an affected lamb. Examination of germ-free filtrates of intestinal contents of affected cases shows the presence, in most

cases, of a variable toxic element, common to the complex toxin produced by the lamb dysentery bacillus (*Cl. welchii*, Type B). The lamb dysentery bacillus itself, by appropriate means, can readily be obtained in pure culture from intestinal contents or ulcers of the mucous membrane and examined in the light of the toxin it produces. This seems the only satisfactory basis for the classification of the toxin-producing anaerobes. Once again, owing to the very nature of the causal organism, excellent prophylatic measures are available.

The importance which we attach to this merits, I think, a rather more detailed account of these methods. Firstly, may I recall the two methods adopted in combating this disease:—

(1) *The Vaccination of the Ewe.*—This method consists of the double vaccination of the ewes with a view to establishing in them an immunity of such a degree that they are capable of transferring sufficient antibody *via* their colostrum to their lambs. The credit for this method of passively immunising lambs is due to Dalling and his co-workers Mason and Gordon, and is of immense benefit when lambing conditions are such as to make serum inoculation of lambs exceedingly difficult or actually impossible, *e.g.*, lambing on the mountain.

(2) *The Serum Inoculation of Lambs.*—As the disease can prove fatal in lambs as young as 12 to 15 hours of age it is consequently essential in this method of treatment to see that the lambs are inoculated within 12 hours after birth. It is true, of course, that this is an impossible undertaking for the general practitioner and it is, therefore, necessary for him to provide his client with the serum, syringe and instructions as to the ways and means of administration.

Apart from these direct means of prevention it is well to bear in mind some of the proven ways by which this disease actually spreads and I regret to say that there is distinct evidence that it spreads to fresh areas in North Wales every year.

The lamb dysentery bacillus being a soil organism, it is at once clear that the pastures on an infected farm are, at the height of the disease in particular, a source of certain infection; likewise any animals removed off such pastures at the period of losses, especially as couples (ewes with lamb at foot), or even ewes, are a means of direct spread to a clean premises. Similarly, rats or crows by dragging the entrails of a dead lamb, left by a careless shepherd, into neighbouring fields can create a fresh focus of infection. It is seldom that the purchasing in autumn of draught ewes or a ram from an infected pasture conveys infection to fresh land, but in the investigation of one outbreak a year or so ago we did have some presumptive evidence that the purchasing of draught ewes from an infected district seemed the only possible means of introducing the disease in that case.

Before I leave the subject of lamb dysentery I would like to draw your attention to what might be considered its most important aspect and one which in its more general application is deserving of serious attention by competent authorities. We have, on occasion, during the past few years been called upon to investigate losses from lamb dysentery in lambs after inoculation. In some instances investigated this was clearly the result of the use of too small a dose. But in others, there was a legitimate complaint, for despite receiving a full dose of serum, the lambs were dying from what, after careful laboratory examination, was undoubtedly lamb dysentery. Close questioning in several instances elicited the fact that the serum was purchased either from a chemist or in quite a few instances from the travellers of the large manufacturing houses who call on the farmers. Detailed examination of the serum used in some instances showed it to be inefficent and led to an investigation of the various brands of lamb dysentery serum available in this country, the results of which were published. Since then some firms have had their serum tested and only place on the market efficient material. There are others, however, that may not have reached that point and may issue for sale serum of another quality. A suggestion was made in our publication of this work that Part II of the Diseases of Animals Act 1935 might be invoked to control the sale or import of such material, and although I have knowledge that certain steps have been taken I am not at all convinced that they have gone sufficiently far to safeguard the reputation both of the practitioner advising the use of serum and of the serum itself, which, if good, has a remarkably high efficiency in the prevention of these losses.

In completing my remarks on the anærobic diseases of sheep, remembering that there exist some which I have not mentioned, I would like to call to your attention the losses sustained among good-conditioned ewes and forward lambs (three weeks to two months) particularly in spring. The history is usually that of sudden death, or death preceded by an illness of a few hours' duration, where periods of great nervous excitement are noticeable. *Post-mortem* examination in a fairly fresh case may show an excess of body fluids (particularly of the pericardial fluid), congestion of the liver, lungs and kidneys with or without a pulpy condition, subepicardial or subendocardial haemorrhages or both.

Investigation has convinced us that in

general in North Wales these, so-called strike or pulpy kidney losses, are due to *Cl. welchii*, Type D, present in the intestinal contents and giving rise to an enterotoxaemia. Two years ago, however, we found that certain losses of a similar nature in ewes in the Llanymawddwy district are due to *Cl. welchii*, Type C, at one time regarded as being the "exclusive property" of the Romney Marsh where McEwen first described it as the cause of "struck" in ewes. The whole interest of these diseases lies in the relationship they bear, aetiologically, to the causal organism of lamb dysentery. Briefly, it is now known that the toxin of the latter (*Cl. welchii*, Type B) has two main factors one of which forms the bulk of the toxin of *Cl. welchii*, Type C and the other the bulk of the toxin of *Cl. welchii*, Type D. It is interesting to conjecture whether a suitable method of immunisation using lamb dysentery vaccine or serum can or will prevent losses from strike or struck and pulpy kidney. We are in fact contemplating the running of a fairly large experiment under the auspices of the Agricultural Research Council this spring in an attempt to show that the inoculation of lamb dysentery serum into lambs at about two or three weeks of age will prevent losses from pulpy kidney. Theoretically, such immunisation is possible and on these grounds only, it has been our practice recently in cases where strike losses have already commenced, to recommend the use of *efficient* lamb dysentery serum. By such, I mean a serum containing antitoxin capable of neutralising the toxins of *Cl. welchii*, Type C or Type D in adequate amounts.

Before leaving the diseases of bacterial origin I would like to mention briefly that commonly known as *infectious pneumonia*, outbreaks of which in recent years have reached alarming proportions. It is most frequently seen in the months of late March to early June and appears to be associated with certain districts, although the evidence on this point is not strong. It is frequently but not always fatal, generally affecting ewes and seldom lambs. It bears a distinct relationship to the prevalence of east winds and the previous herding of the flock either under cover or in the open. You are probably aware of the usual symptoms, which in those cases which are not obvious are accelerated by having the dog chase the flock for a short distance, the disturbance setting up a cough which may be detected in several animals which on casual observation appeared more or less normal. Most of our work on this disease has been done in conjunction with the Institute of Animal Pathology, Cambridge. In every outbreak, without exception, we have been able to isolate apparently the same organism—a Gram-negative bacillus not unlike the Pasteurellas in colony formation and morphology (it has a tendency to bi-polar staining). While it grows easily in ordinary media on first isolation it is most difficult to keep alive in the laboratory despite frequent subcultivation. It is highly pathogenic to mice but we have failed, as have the Cambridge workers, to set up experimental infection in sheep with this organism by any route. Perusal of the literature shows that the condition in several respects, even aetiologically, is not unlike that described by Dungal as occurring in Iceland. The theory of a filterable virus being at the root of the trouble has been explored but not proved and a full account of the work done by the workers at Cambridge will, it is hoped, appear shortly.

At present treatment of the condition presents apparently a hopeless problem but on the grounds of the similarity to the Pasteurella group, of the organism isolated so regularly, haemorrhagic septicaemia vaccine or sera has been recommended. The results of this have been conflicting, as regards our estimation of their efficiency. Of late I have wondered whether this is due not so much to a completely incorrect reasoning as to an inefficient haemorrhagic septicaemia serum or vaccine. The excellent work of Priestley on the capsule of the pasteurellas leaves no room to doubt that extreme care is needed in the preparation of efficient vaccines and sera from this group of organisms since overheating may seriously detract from their greatest antigenic asset.

Metabolic Diseases

A disease which has come into prominence in recent years is *pregnancy toxaemia* or *in-lamb ewe disease*. Despite much work both in this country and abroad, its exact nature has not been determined. It is described as a metabolic disturbance which is often, but not exclusively, associated with a twin pregnancy. Its occurrence in a flock is frequently associated with a typical history that the ewes were on good pastures up to the end of autumn or beginning of winter and were then moved on to a poorer pasture on which they grazed up to the time of illness. In the last few weeks of pregnancy the ewe is often in poor condition although on *post-mortem* examination a fair amount of abdominal fat may be present. The liver shows the outstanding lesions, being enlarged and very fatty. The chief symptom is that of increasing coma and blindness. Chemical analysis of the blood has led to several conflicting theories, depending upon whether there is or is not a calcium or magnesium deficiency. As a result of this, treatment with these elements together with glucose had been employed, but without serving any useful purpose. Strangely, however,

if the ewe lambs or aborts recovery may follow almost spontaneously.

It appears, therefore, that some rational form of preventive treatment is the only one available at the moment and it would seem that supplementary feeding is indicated where pastures on which in-lamb ewes are grazing have become poor and that this should be continued up to the time of lambing. The remedy of exercising the sheep has withstood the ridicule once thrown upon it and, where practised thoroughly, has been the means of preventing such occurrences. It is important to see that the sheep are exercised on a hard road surface for about half a mile distance each way at least one a day. In ewes in which symptoms have just commenced a dose of salts has often been reputed to turn the tables in favour of recovery.

In some districts and more generally of late, a condition referred to as snow blindness or clefyd yr eira has claimed our attention. Its resemblance to pregnancy toxaemia is striking but for the fact that it can occur in non-pregnant ewes and yearlings. It occurs as the name suggests, when pasture is unavailable owing to snow and for this reason it appears, as regards its aetiology, to be in keeping with the underlying theory of pregnancy toxaemia. Again, blood analysis reports are conflicting and although the inoculation of calcium or magnesium may at times result in a temporary recovery, the condition recurs. The possibility of exercising the sheep may be a forlorn one under such circumstances as those in which this disease occurs but, if practicable, this measure should be resorted to. Hand feeding is a more or less natural proceeding when a farmer finds that pasture is not available.

In some circumstances it is possible to confuse pregnancy toxaemia with milk fever or lambing sickness, which may occur a little before lambing. There is no occasion to describe this condition in detail as it must be one well known to you. It is definitely associated with a hypocalcaemia and to some extent a hypomagnesaemia and responds to simple udder inflation. Similarly, it is possible to confuse pregnancy toxaemia with fluke in in-lamb ewes. Fluke infestation in such cases may not necessarily give rise to the usual text-book symptoms of a razor back, pendulous abdomen or swelling in the submaxillary region, although the two former are present in pregnancy toxæmia but may be associated with an intense lethargy.

Parasitic Diseases

With the discovery by Montgomerie of the value of carbon tetrachloride in the treatment of "fluke," this has ceased to cause the widespread losses which occurred previously, but can and still does, cause severe losses on individual farms. I do not intend entering upon a description of the life cycle of *Distomum* but I will draw your attention to one or two points which I consider important even now, when it is assumed that we know all there is to know about the disease, its cure and prevention. The fact that the miracidium chooses one type of fresh water snail almost exclusively in this country is knowledge which gives us tremendous power to cope with the disease. By the simple means of exterminating *Limnoea truncatula* we can in one sweep, so to speak, eliminate *Distomum*. The copper sulphate treatment of land (July to September) to kill off its Limnoea population is a point which needs emphasising. It is too often forgotten that, although definitely diminishing the number of fluke eggs available for pasture contamination by the treatment of fluke infected sheep, both cattle and rabbits can and do become infected with the cercariae liberated from infected snails and so continue to be a source of egg production. The effect of fluke infestation in cattle is almost identical with that in sheep with a tendency to the more chronic type. The treatment of cattle with carbon tetrachloride is attended by greater risks of fatal results than in sheep. Despite this, dosage with the drug has been attempted with good results. Male fern or Danistol can also be recommended, although the former has toxic tendencies akin to those of carbon tetrachloride.

The questions of the diagnosis of fluke in cattle, in particular, and the occasion for redosage are the two concluding references I will make to this disease. In relation to the first, I cannot over-emphasise the value of faeces examination for fluke ova. While a negative finding is not always an indication of the absence of fluke infestation, a positive examination provides an easy and accurate means of arriving at a satisfactory diagnosis in most cases. While on the subject of faeces examination may I stress its value in diagnosing the presence of infestation with other parasites, nematodes or coccidia and also Johne's disease. The value of such an examination must lie in a positive result.

The question of redosage with carbon tetrachloride arises from the fact that the drug in a dose of 1 c.c. will kill only mature flukes (approximately ten to fourteen weeks of age) so that if the disease is diagnosed treatment should be repeated in a month's time and the sheep carefully grazed to prevent re-infection as far as possible. Here again faeces examination is of value since with the destruction of the adult flukes, ova vanish from the faeces but when the younger flukes reach maturity egg-laying commences again and so redosage can be timed accurately.

When referring to liver rot one cannot help thinking of parasitic gastro-enteritis—an all-too-common complaint among *young* sheep in particular.

The symptoms are well known in their most common form but a great deal of loss is sustained among lambs by the condition referred to as "not doing well" which in the majority of cases, is attributed to this cause. Despite a great deal of research work on the subject there appears no uniformity of opinion as to how these nematodes actually cause disease and from our own experience we find this equally difficult to determine. Their presence in excessive numbers is often quoted as a cause but experience shows us that whereas a good thriving yearling may harbour as many as 20,000 to 30,000 nematodes, an emaciated lamb which one would diagnose clinically as the subject of parasitic gastro-enteritis may harbour as few as 500 to 1,000, or even less. The question of species is often mentioned; here again, whilst admitting that heavy infection with Haemonchus can cause serious losses, similar losses are met with where the Haemonchus population is low. Similarly, the various members of the Trichostrongylus group in large numbers can affect the animal seriously, but several cases are met with where the count of these nematodes is low. A great deal of work has yet to be done on this aspect of the condition. It is possible that the final word will tell us that it is a combination of several factors.

It can for all practical purposes be accepted that there is a similarity in the life-cycle of all these parasites, particularly of those infesting the intestine, and I may remind you once again, that it is highly important that vital points regarding the parasites should be known, when one is attempting to give advice as to possible methods of prevention. The most important to remember are that it takes a minimum of six days after the egg is passed in the faeces for hatching and development to the *infective larval* stage to be reached and that such larvae are particularly resistant to extremes of temperature and moisture, some remaining viable on pastures for as long as twelve months. An interesting fact of great importance is their ability to regain the surface from a depth of six inches in as short a period as seven days—making ploughing a none-too-certain means for their destruction. Prevention resolves itself into the treatment of infected lambs and apparently non-infected "carrier" ewes in an attempt to diminish the number of eggs laid and the prevention of lambs, in particular, gaining access to pastures where *infective larvae* are present.

The value of copper sulphate (generally used in a one per cent. solution) in the treatment of parasitic gastritis due to Haemonchus is well known. More recently, McEwen has shown that a stronger solution of copper sulphate (five per cent.) together with a five per cent. solution of nicotine sulphate is particularly efficient in the destruction of both the larger and smaller stomach worms. While admitting that nicotine sulphate is to a large extent poisonous, yet, carefully used, it seems to be the most useful remedy for this complaint that we have at our disposal.

A lively discussion, in which most of the members took part, ensued on a number of points raised in Mr. Rowlands' paper.

Mr. Rowlands replied to questions as they were put to him and in the course of his remarks said that he was of the opinion that the organism responsible for lamb dysentery produced its toxin in the small intestine. It was not necessary that the primary infestation should be heavy as the organisms did their damage by virtue of a rapid multiplication during which they produced a large amount of very potent toxin soon after entering the intestinal tract. If asked, he would say that four to six months was the shortest time which should elapse before sheep could be moved from infected pastures to clean pastures with safety. He thought it would be quite safe to move lambs in autumn.

In answer to an enquiry regarding dosage of serum, Mr. Rowlands said he thought that 3 c.c. of lamb dysentery serum was too small a dose unless such inoculations, using 5 c.c., had been practised on a particular premises for the previous two or three years. Such inoculations should be continued for at least six seasons when, unless losses appeared, they might be discontinued. He pointed out that since *Cl. welchii* Type B toxin contained the toxins of *Cl welchii* Type C and D, efficient lamb dysentery serum might afford immunity against "strike" in ewes and "pulpy kidney" in lambs. Mr. Rowlands emphasised the importance of inoculating lambs with lamb dysentery serum within twelve hours after birth. He also explained that another method of preventive inoculation could be used by inoculating the ewes with vaccine once just prior to tupping and later about 14 days before lambing.

The organisms being spore-bearing, were very resistant and the disease appeared to attain its most virulent form after about three years. He said that a number of fresh outbreaks occurred in North Wales last year. Asked why there was not much lamb dysentery in mountainous areas, Mr. Rowlands said he thought the explanation lay in the fact that the sheep were more scattered and therefore less liable to pick up infection. The disease was more common on farms where the ewes were brought to lamb in small fields close to the homestead. With regard to the period of incubation, the essayist expressed his inability to state a definite time, but pointed out that it might be very short as a lamb only a few hours old could die of the disease. Once infection entered a premises the disease would occur next lambing season. It should be remembered that the lambs were not born infected but picked up infection from the pasture or contaminated udder of the ewe.

Dealing with pulpy kidney disease, Mr. Rowlands explained that his suggestion of exercising as a method of prevention had the object

of reducing the condition of the too-forward lambs. In the case of pregnancy toxaemia this exercise probably stimulated metabolism sufficiently to prevent the accumulation of toxic products. In-lamb ewes on poor pastures should be given supplementary feeding up to the time of lambing. He agreed that an aperient such as magnesium sulphate would be beneficial: this principle of purgation no doubt explained the efficacy of the treatment given by some farmers in the area, mentioned by a member present, where the administration of half-a-pint of sea water together with a dose of a certain preparation of aloes was practised.

With regard to liver rot, the essayist reminded his listeners that lime does not kill the snail host as does copper sulphate. This latter, in the form of a powder containing one part of copper sulphate and four of sand, scattered over the land in the proportion of two-and-a-half hundredweight to the acre, was a very efficient method of dealing with the pasture. Ditches should be thoroughly cleaned out and the sides cut sharply.

In connection with the treatment of sheep affected with parasitic gastritis, a number of drugs had been mentioned by the speakers, including arsenic, copper sulphate and nicotine sulphate. These, he agreed, were often efficacious but, as had been pointed out, they might have dangerous consequences. Carbon tetrachloride was also likely to prove toxic in some sheep and particularly in cattle, which appeared to be far less tolerant of the drug than sheep. This particular danger seemed greater if the animals were being fed on concentrates. He was not surprised to hear the report of a member that after dosing heifers with nicotine sulphate they had collapsed and become comatose. The symptoms were often most alarming.

MILK FAT STANDARDS CRITICISED

In a report to Hull Corporation Sanitary Committee, the city analyst, Mr. Arnold R. Tankard, suggested that the standard of fat in milk should be raised and made seasonal, and also that it should be an absolute and not merely a presumptive one.

His proposal was that the minimum fat standards should be 3·5 per cent. from October to March and 3·25 per cent. in other months.

Mr. Tankard pointed out that, by the Sale of Milk Regulations, 1901, milk containing less than 3 per cent. of milk fat, or less than 8·5 per cent. of non-fatty solids, was presumed not to be genuine. The "standard" which those regulations set up was, therefore, only a presumptive standard or limit, and the presumption of a milk's non-genuineness could be rebutted by the vendor if he could prove, for example, that the milk was of the same composition as when it came from the cow.

Milk of normally good quality ought to be available to the public, and normal quality milk was not one containing barely 3 per cent. of fat, but 3½ per cent., or more, a figure which was easily reached in the mixed milk of most herds.

During the year 1937, when 1,265 samples of whole milk were examined by his department, 77 per cent. of the winter milks and 73 per cent. of the summer milks conformed to the standards he suggested. If cows were bred less for quantity of milk, to the exclusion of quality, those figures would be much improved.

ABSTRACTS

[The Occurrence of Paratuberculosis in Sheep. Dieter, R. (1937.) *Zschr. Infektkr. Haust.* 5. 41. 74-78.]

Post-mortem examination of three sheep from the same flock revealed lesions which were at first mistaken for those of parasitic gastro-enteritis. These consisted of marked oedematous infiltration of the mesentery, of the mesenteric lymph glands and of the serous coats of the intestines and the mucosa and submucosa of the abomasum. The mucosa of the intestines was also thickened and firm, giving a smooth surface. The contents of the abomasum and intestines were watery. Only a few parasites were found but smears and sections of the intestinal mucosa revealed acid-fast organisms.

The author discusses similar outbreaks described by Stockman and others and is of the opinion that paratuberculosis (Johne's disease) is more common in sheep than is supposed, owing to the similarity of the symptoms and lesions to those of parasitic gastro-enteritis.

A. T. P.

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[Investigations into the Transmission of Horse-sickness at Onderstepoort during 1932-1933. Nieschultz, O., and du Toit, R. M. (1937.) *Onderstepoort J. of Vet. Sci. and Anim. Husb.* 8. 1 and 2.]

The investigation into the transmission of horsesickness was continued during the summer of 1932-1933 at Onderstepoort. This summer proved to be exceptionally dry, but in spite of this, horsesickness was very prevalent and severe during March and April, 1933. Contrary to the general belief, it would appear that there is little or no relationship between the amount of rainfall and the incidence of the disease.

It was found that a number of horses stabled at night also contracted the disease; infection is thought to occur in the open during the night or at sunset, but in these cases infection must have taken place during the daytime when the animals were kept in kraals; control horses stabled during the day and night were not affected.

An insect survey of the neighbourhood revealed the presence of 16 species of mosquitoes, comprising *Aëdes*, *Anopheles* and *Culex*. Larvae of *Anopheles* were found during the dryest part of the season in the bed of a river and in a small marshy area formed by a leaking water pipe. Moderate rainfall destroyed the breeding places and washed the larvae away. Since the breeding of this species was not affected by low rainfall they were regarded as potential transmitters of horsesickness.

For experimental purposes the different species of mosquitoes were housed for varying periods in an electrically heated room. The strains of virus used for infecting the mosquitoes were obtained from spontaneous cases of horsesickness and only fresh material or early generations of mouse-passaged virus were used. The mosquitoes were fed on horses which had been infected by intravenous inoculation of infective blood or exposed to direct contact with infected horses; feeding occurred at different stages of the febrile reaction. After the mosquitoes had become infected, susceptible horses were inoculated subcutaneously with the infected insects, or the mosquitoes were allowed to engorge themselves upon the animals.

During the two seasons a total of 66 experiments was performed and of these only four were positive. In the first positive experiment five *Culex theileri* were infected about twelve hours after their initial feed; in the second, 294 *Aëdes* species after six days; in the third, 134 *Aëdes* species after seven days; and in the fourth, 23 *Anopheles* after seven days. All the feeding experiments were negative. Hence the virus of horsesickness may remain alive up to seven days in *Aëdes* and *Anopheles*, but it cannot be transmitted by the feeding of infected mosquitoes, and mosquitoes do not appear to be transmitters of the disease. The virus was found to be rapidly destroyed in all other species investigated.

The eggs of two species of ticks, *Rhipicephalus appendiculatus* and *Hyalomma aegyptium*, which had engorged on a spontaneous case of horsesickness, were inoculated into susceptible horses with negative results.

E. C. H.

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[East Coast Fever: Its Transmission by Ticks in Kenya Colony. Fotheringham, W., and Lewis, E. A. (1937.) *Parasitology*. **29.** 4. 504-523.]

Further investigations into the vectors of East Coast fever were undertaken in view of peculiar sporadic cases of the disease which occur in Kenya, and are often associated with febrile reactions in other animals in which Koch's bodies cannot be demonstrated. The ticks used in the experiment were raised in the laboratory on hares, rats, sheep and cattle, from clean farms and different batches of ticks were tested as to freedom from infection at each stage.

Transmission of East Coast fever by nymphs and adults of *Rhipicephalus appendiculatus* infected as larvae or nymphs was confirmed, as also was transmission by adults of *R. simus* and *R. evertsi*. Experiments with *R. sanguineus*, *R. pulchellus* and *Amblyomma variegatum*, were negative.

Exposure of infective nymphs of *R. appendiculatus* to refrigerator temperatures, to alternating temperatures and to temperatures of 37° C. did not affect the virulence of the parasite, though at the last temperature ticks did not survive well.

Hyalomma impressum near *planum* (*H. aegyptium*) was found to be capable of transmitting East Coast fever in the nymphal and adult stages after the larvae or nymphs had fed on infected animals. In one case an animal infected by *H. impressum* recovered and proved immune to East Coast fever on exposure on infected pasture.

In some cases encountered during the experiments, cattle developed a mild temperature reaction not accompanied by clinical symptoms, but on recovery proved immune to East Coast fever. In such cases Koch's bodies might be rare and difficult to demonstrate.

One case is recorded in which *R. appendiculatus*, which had been fed as nymphs on a case of "turning sickness," transmitted East Coast fever as adults, but in this case the ticks were not raised in the laboratory.

U. F. R.

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[Magnesium and Calcium Content of Hedgehog Serum During Hibernation. Suomalainen, P. *Nature*. **141.** 3567. 471.]

The sera of two groups of hedgehogs were analysed: one group in early October—four to five weeks before the final onset of hibernation—the other in early January when hibernation was at its deepest.

A summary of the findings is given in the following table.

No. of Hedgehogs Examined.	Mg. Content in mgms. per cent.		Ca Con tent in mgms. per cent.		Average Ca : Mg. Ratio.
	Range.	Average.	Range.	Average.	
Early October : 7	2·90–3·5	3·2	9·2–10·6	10·0	3·15 : 1
Early January : 6	4·90–6·05	5·43	9·6–10·7	10·2	1·88 : 1

Reference is made to the anaesthetic effect of the magnesium ion on invertebrates and veterbrates and the disappearance of this anaesthesia after the injection of calcium. Attention is drawn to the fact that in his experiment on hedgehogs, not only is there a 70 per cent. increase of the magnesium content of the serum during hibernation, but also there is a considerable change in the Ca:Mg ratio, as the Ca content of the serum remains the same.

H. H. S.

[**Adenoma and Carcinoma of the Liver in Deer.** Krause. (1938.) *Arch. wiss. prakt. Tierhlk.* **73.** 1. 1-24.]

Primary tumours of the liver are common among wild deer in Germany, and eight new cases are described in detail, making 15 records of such tumours in all. All the cases occurred in animals over five years of age.

The tumours were usually single and frequently led to the production of metastases in such sites as portal lymph glands, lungs, and mediastinal glands. All transitions were found between adenoma and carcinoma, and the neoplasms usually arose from liver cells, rarely from bile duct epithelium.

It is suggested that their frequency may be related to a direct or indirect effect of gastric and intestinal strongylosis.

E. G. W.

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[**Some Details of the Staining of Paraffin Histological Sections with a Solution of Azure-Eosin, of Mayer.** Souza, P. R. de. (1936.) *Arch. Inst. Biol. Sao. Paulo.* **7.** 51-54.]

A solution having the same properties as the Giemsa stain was used in a series of experiments to test the effect of a number of factors on the results of staining tissues by this medium. Portions of tissue of varying sizes were hardened in Zenker's fluid, with or without acetic acid, and during various periods of time. Tissues were embedded in paraffin and sections stained in the solution which had a *p*H concentration of about 7·2. Conditions showing a more markedly unfavourable effect on the results were: the presence of acetic acid in Zenker's fluid, incomplete hardening when fixation was shorter than 18 hours, and the size of the pieces placed in Zenker's fluid when larger than 2 millimeters in thickness. If the period of time during which the buffered staining solution acted upon the sections was shorter than one of 24 hours, the results were unsatisfactory.

D. J. A.

HOLIDAY TOURS ON HORSEBACK

Weekly tours for horsemen, showing each day's itinerary, together with maps of the districts, are to be issued this summer by the Institute of the Horse and Pony Club, 66, Sloane Street, S.W.1. It is stated in *The Horse*, the Institute's quarterly journal, that the tours will be sent free to members of the Institute and sold to non-members. They are being prepared to cope with the increasing demand for particulars of routes by those contemplating a riding holiday. The itineraries will take riders through some of the most picturesque parts of the country and will mark the registered hotels and inns which can provide stabling for at least three horses.

REVIEW

[**"Modern Milk Production."** Bulletin No. 52 of the Ministry of Agriculture and Fisheries. Published by His Majesty's Stationery Office. Price 9d. net.]

The publication of a second edition of this bulletin is to be welcomed, especially at the present time when such vigorous steps are being taken by the Government to help in the improvement of the health of the herds of the country.

The bulletin is primarily written for dairy farmers and discusses fairly fully such problems as the selection of dairy cattle, methods of milking, the recording of milk yield and its value, and the necessity for cleanliness in dairying. The arrangement of the material is well balanced and most relevant points of importance to the dairy farmer are brought in. The more recent developments in the recording of dairy cattle, such as the scheme for progeny recording of dairy bulls, are discussed and their importance stressed. The booklet clearly indicates the advisability of giving due consideration to the choice of dairy cow, the recording of its milk, cleanliness and a host of other matters highly important to successful dairying, yet it refrains from any suggestion of coercion. It is an admirable example of the British method of striving to get things done by reason and persuasion rather than by the framing of stringent laws.

The purchase of this bulletin for a few pence would amply repay the outlay to veterinary surgeons and students as well as to all dairy farmers.

FOOT-AND-MOUTH DISEASE

Effect on Bath and West Show

Outbreaks of foot-and-mouth disease were confirmed among cattle at Holbeton, Devon, and at Brookland, Kent, this week. Orders have been issued, taking immediate effect, imposing the usual restrictions on areas of approximately 15 miles radius round each of the infected premises. The areas affected lie in Devon and Cornwall and in Kent and East Sussex respectively.

The site of the Bath and West and Southern Counties Show, which opens on May 25th at the Central Park, Plymouth, lies within the affected area. The Society have decided to go forward with the show although 68 cattle classes, as well as classes for sheep, pigs and goats, numbering altogether nearly 900 entries, must be excluded owing to the Standstill Order.

The Veterinary Record

May 21st, 1938

Sheep Disease Control

WE publish in this issue of the *Veterinary Record* two articles of much interest and importance concerning diseases of sheep.

It is not many years since our knowledge concerning the diseases affecting sheep was in a state of chaos and the only control measures were those carried out by the farmer himself, based largely on the results of his practical experience which in some cases at least were successful. The veterinary practitioner played little or no part in the control because his advice and assistance were seldom, if ever, sought. Times, however, have changed and to-day the veterinary practitioner is relied upon by the sheep farmers to assist in preventing losses. Thanks to the increase in our knowledge of the causation of some of the important sheep diseases, methods of control have been devised and the veterinary practitioner can now diagnose many of the diseases and, in some cases, at least, prescribe the necessary measures of control. Sheep farmers have, to a large extent, changed in their attitude towards losses in their flocks, and, instead of simply accepting such losses as inevitable, readily seek advice from the veterinarian and have become keen collaborators in the study of disease problems.

Little of a definite nature was known concerning the cause of many of the diseases of sheep till veterinary research workers began to study the problems. When encouragement was given to the profession to occupy its rightful place in the field of research, the workers saw this almost untouched field and concentrated efforts were made to understand some of the causes. These workers were greatly assisted in their early investigation by a small group of keen sheep farmers who willingly collaborated with them. The whole sheep-farming community owes much to those who played such an important part in this early research work. We feel that a tribute should be paid to the Directors of the Highland and Agricultural Society who, together with a few progressive sheep farmers, took the initial steps which led to the establishment of the Animal Diseases Research Association.

As an indication of the success which has already attended the investigation of sheep diseases by the veterinary profession, we may mention that conditions such as braxy, lamb dysentery, pulpy-kidney disease, enterotoxaemias of sheep, tick-borne fever, louping-ill, parasitic gastritis and liver-rot, have been studied and methods for their control devised. There is still further information necessary before we can truthfully claim to understand such diseases fully, but in each case there has been reached a stage whereby control methods can be successfully practised. The list of diseases under investigation at the present time is long, but there is little doubt that as research progresses similar success will be obtained in such diseases as swayback, scrapie, pregnancy toxæmia, joint-ill in lambs, various forms of "pining," and pyæmia associated with tick bites.

The veterinary practitioner to-day, then, is in a much happier position than was his predecessor. He can, at least in some of the important diseases, make an accurate diagnosis and prescribe the requisite method of treatment and control. Further, he can obtain the advice and assistance of members of his own profession when he encounters outbreaks with which he is not familiar. We would point out here the great value of the veterinary practitioner and through him, of the sheep farmer to the research worker in providing the necessary material.

The veterinary profession has, however, a further part to play in the control of losses among sheep. Every year it becomes more evident that certain sheep diseases are essentially concerned with systems of sheep husbandry. To understand the relationship between special systems of husbandry and mortality among sheep it is essential that veterinary surgeons possess a greater knowledge of sheep management generally. We feel strongly that greater opportunities must be given during the training of veterinary students for the acquiring of the essential fundamental knowledge concerning sheep husbandry and that as much attention should be paid to this branch of animal husbandry as to that of any of the other domestic animals. The sheep-rearing industry in this country is all-important. It can only prosper and maintain its high level of importance if due attention is given to the health and welfare of the animals concerned. This is only possible if the veterinary profession, through its practitioners and research workers, plays its rightful part in all the various aspects of the industry.

ROYAL COLLEGE OF VETERINARY SURGEONS

QUARTERLY MEETING OF COUNCIL

The Quarterly Meeting of Council of the Royal College of Veterinary Surgeons was held at 10, Red Lion Square, London, on Friday, April 8th, 1938.

Lieut.-Colonel P. J. Simpson, D.S.O., T.D., F.R.C.V.S., J.P., President, occupied the chair, and there were also present Mr. J. C. Coleman, Professor J. F. Craig, Messrs. H. W. Dawes, P. F. Dolan, Sir Frederick Hobday, Mr. J. Holroyd, Major Hamilton Kirk, Messrs. G. H. Livesey, J. W. McIntosh, A. MacKenzie, G. P. Male, Captain T. M. Mitchell, Lieut.-Colonel W. S. Mulvey, Mr. W. Nairn, Professor J. J. O'Connor, Captain R. Simpson, Mr. Arnold Spicer, Mr. J. F. D. Tutt, Colonel G. K. Walker, Dr. A. W. Whitehouse and Professor G. H. Wooldridge.

The minutes of the previous meeting were taken as read and signed as correct.

The Secretary reported that letters expressing regret at inability to attend the meeting had been received from Professor J. B. Buxton, Sir John M'Fadyean, Major Mattinson, and Lieut.-Colonel T. Dunlop Young.

CORRESPONDENCE

(1) From Mr. F. J. Taylor, dated April 6th, and addressed to the President, in which Mr. Taylor intimated his desire to retire from the Council in the following terms:—

"It is with the deepest regret that I respectfully tender my resignation as a member of your Council, and committees, of the R.C.V.S., but I find my present income has been so seriously reduced by the appointment of whole-time veterinary officers in the county and city of Oxford that I can no longer afford to occupy my position on the Council, etc."

The President: I am sure that I voice the feelings of all of you when I say that we are very sorry indeed to lose the services of Major Taylor. He has evidently come to a final decision, however, and it is for us to pass a motion accepting his resignation with very great regret. I beg to move accordingly.

Major Kirk: As the one who nominated Major Taylor, I very much regret that he is leaving us, and I should like to second the motion.

The motion was carried.

(2) From the National Association for the Prevention of Tuberculosis, announcing that the Twenty-fourth Annual Conference will be held in London, on June 30th and July 1st and 2nd. The Secretary said that there would be a meeting dealing with the control of tuberculosis in tropical and sub-tropical regions, but so far as he could see, there was no special veterinary meeting. There was the usual invitation to send a delegate.

On the motion of Professor Craig, seconded by Professor Wooldridge, it was resolved to appoint the President or his nominee as delegate to the conference.

(3) An invitation to appoint a delegate or delegates to the Thirteenth International Veterinary Congress, to be held in Zürich from August 21st to 25th and at Interlaken on August 26th and 27th.

On the proposition of Professor Wooldridge, seconded by Sir Frederick Hobday, it was resolved two delegates be sent, these to be the President (or his nominee) and Vice-President at the time.

It was agreed, further, on the proposition of Sir Frederick Hobday, seconded by Mr. Male, that each delegate be allowed the sum of 15 guineas for expenses.

(4) From the Secretary of the Glasgow Veterinary College, Incorporated, dated February 11th, suggesting that the Royal College of Veterinary Surgeons should appoint an additional governor.

Mr. Male: I beg to propose that Mr. Donald Campbell be our nominee.

Sir Frederick Hobday seconded the motion, which was carried.

Obituary.—The Registrar read the list of members whose deaths had been reported since the last meeting.

The members stood while the list was being read.

Reports of Committees

Finance and General Purposes Committee.

Mr. Nairn (Chairman) read the following report of the Finance and General Purposes Committee, dated April 8th, and moved its reception and adoption:—

The minutes of the previous meeting, having been printed and circulated, were taken as read and signed as correct.

Financial Statement.—The Treasurer submitted his Financial Statement for the quarter, showing a balance in hand of £84 0s. 4d. and liabilities amounting to £583 10s. 7d.

The Treasurer's statement was adopted and he was ordered to pay the liabilities shown together with cheques for current expenditure.

Library Grant.—A maintenance grant of £100 (one hundred pounds) was made to the Library for the current year.

Library Book.—The Librarian reported that the member who had refused to return the book borrowed from the Library had returned it after receiving an account for the cost.

Annual Fees.—The Secretary reported the number of members who had not paid the annual fee during the past year and was instructed as to the steps to be taken to recover the fees.

Annual Report.—The draft annual report on the work of the Finance and General Purposes Committee during the past year was submitted and approved.

Major Kirk: I beg to second the motion. I was not present at the meeting this morning, for which I express regret, and I should like to enquire whether there is any way of dealing with members who borrow books and refuse to return them and do not acknowledge our letters. If such a member asks for another book, is he to obtain it? In the case in point, the member gave us a great deal of trouble.

The President: The matter was discussed and dealt with in the meeting, and I do not think that any good purpose would be achieved by publishing the conclusion come to at that meeting. It is really a question which should be addressed to the Library Committee.

The report was adopted.

Examination Committee.

Mr. Livesey (Chairman) presented the following report of the Examination Committee, dated April 7th:—

The minutes of the previous meeting, having been circulated, were taken as read and signed as correct.

Correspondence.—(*a*) A letter was received from Mr. J. McAllan asking whether extra-mural instruction given by him to veterinary students who were likely to enter the Colonial Veterinary Services could be accepted as fulfilling part of the requirements of Bye-law 74.

It was resolved, "That in the special circumstances such instruction up to a period not exceeding one month be recognised."

(*b*) *Animal Management.*—Correspondence with the External Examiners in Animal Management in regard to the examination to be held in May was submitted.

It was resolved, "That the examination in Animal Management be fixed to commence not earlier than Monday, May 16th."

(*c*) An application was received from a candidate who had been granted *pro tanto* exemption under Bye-law 62, but had failed to complete his qualification for the full exemption in regard to Organic Chemistry, to be allowed to take the Second Examination of the College on May 30th, and complete his examination in Organic Chemistry at the University of London examination on July 7th.

It was resolved, "That the application cannot be acceded to under the Bye-laws."

Reports of Sub-Committees

(*a*) *D.V.S.M. Sub-Committee.*—This committee reported that it had held two meetings and had given consideration to the need for revision of the Syllabus of Examination. Progress had been made, and a further report would be submitted in due course.

(*b*) *Examination Syllabus.*—The Special Examination Committee reported that it had held four meetings but was still engaged in the work of revising the Syllabus of Examinations. A report would be presented as soon as the work was completed.

(*c*) *Cambridge University Scheme.*—This subcommittee reported that it had held one meeting and had decided to invite representatives of the university to attend a meeting in London to discuss the revised scheme for veterinary teaching and examination at the University of Cambridge, but that it had not yet been possible to arrange such a meeting.

Educational Certificates.—A list of educational certificates Nos. 5967-5972, 5974-6024, was submitted and approved. The Secretary was authorised to accept the certificate submitted by candidate No. 6033a.

Exemptions and Concessions.

(*a*) *Bye-law* 62.—It was resolved, "That exemption under the provisions of Bye-law 62 be granted in the following cases: 5999, 6025-6028 and 5567; *pro tanto* (in respect of Biology only) 5998, 6029."

It was further resolved, "That a Northern Universities Conjoint Board Higher Certificate in Zoology, Botany and Chemistry, as principal subjects, and Physics as a subsidiary subject, be accepted as qualifying for exemption under this Bye-law."

(*b*) *Bye-law* 95.—Applications from four foreign veterinary graduates for admission to the Final Examination for the Membership Diploma under the provisions of Bye-law 95 were considered, but not acceded to.

(*c*) *D.V.S.M.*—An application from a candidate who failed at the examination in November, 1937, and is now employed by the Ministry of Agriculture, for permission to take the examination again, sitting for the two groups separately, was acceded to.

(*d*) *Examination Fees.*—It was resolved, "That the examination fees of candidate No. 4075, who was prevented by illness from taking the examination in December, 1937, be held over to the next examination."

Appointment of Examiners.—Applications for appointment as Examiners were considered, and the committee reported in confidence with recommendations as to the elections to be made.

Animal Management Examination.—It was resolved to recommend, "That a fee of £1 1s. 0d. be charged for examination or re-examination in Animal Management, and that Bye-law 67 (*b*) be amended accordingly, the rule to come into force in respect of examinations held in and after November, 1938."

Veterinary Education Committee.—The President reported that at the request of the Veterinary Education Committee he had again attended before the committee in company with the Chairman and Secretary, for the purpose of answering questions put to them by the committee. They had been requested to attend a further meeting in the near future.

Annual Report.—The draft annual report of the work of the committee during the past year was submitted and approved.

During the reading of the report, the Council went into committee on the motion of Mr. Livesey, seconded by Professor Craig.

On resuming, Mr. Livesey said: "I move the reception and adoption of the report of the Examination Committee, as amended in committee.

Professor Craig seconded the motion, which was carried.

Registration Committee.

The Secretary read the first report of the Registration Committee, dated April 6th as follows:—

The minutes of the previous meeting, having been printed and circulated, were taken as read and signed as correct.

Cases

N. 148. Using title, "Dog and Cat Specialist." The Solicitor reported that no further evidence had been received and the case was struck out.

N. 171. Using title for premises. The Solicitor reported that the words used did not constitute an infringement of the Veterinary Surgeons' Act, and it was resolved that no action be taken in this particular case.

N. 173. Carey, E. G. Using title "Veterinary Surgeon." The Solicitor reported that a prosecution had been instituted in this case and that the defendant had been fined £1 with £1 1s. 0d. costs.

N. 50. Using title "Canine Dr."

N. 176. Using title "Canine Feline Doctor."

N. 177. Using title "Canine Practitioner."

N. 178. Using title "Animal Doctor."

In these four cases the titles used were published in the telephone directory, and the President reported that he had got into touch with the Postmaster General (through Sir Robert Gower) and steps had been taken to have these titles removed from the next editions of the directory.

The thanks of the committee were accorded to the President for his good offices in this matter.

N. 59. Using title "Canine and Feline Specialist."

This case was referred to the National Veterinary Medical Association.

N. 175. Use of letters "M.R.C.V.S.L." The Secretary submitted correspondence in this case which was considered satisfactory.

N. 179. Name inserted in list of veterinary surgeons in the classified telephone directory. The Secretary submitted an apology from the publishers of the directory and an undertaking that the error would not be repeated.

N. 180. Described as "Veterinary Surgeon" in newspaper report. The Secretary submitted a letter from the editor of the newspaper apologising for the mistake and promising that care would be taken in future not to repeat the error.

N. 94. Using titles "F.Z.S., F.R.S.A." in connection with a canine and feline surgery. The Secretary submitted correspondence with the Zoological Society and the Royal Society of Arts and his action was approved.

N. 181. Galbraith, W. T. The Secretary reported that this person had been prosecuted for cruelty by the R.S.P.C.A., and convicted. It had been brought out in court that he was not a registered veterinary surgeon.

Annual Report.—The draft annual report of the work of the committee during the past year was submitted and with a few verbal amendments was approved, the report to be completed by the Registrar in consultation with the President, and Chairman of the Library and Publication Committee.

The President moved from the chair the reception and adoption of the report.

Mr. Male seconded the motion, which was carried.

The President: There is one thing which I should like to mention at this juncture. I receive thanks in the report for certain services which were not really mine so much as those of Sir Robert Gower, the Chairman of the R.S.P.C.A. I pointed out to him these errors in the telephone directory, and it was he who got into direct communication with the Postmaster-General. We are hoping that they will not appear in the telephone directory again.

The Secretary then read the second report of the committee, dated April 7th, as follows:—

The minutes of the previous meeting, having been printed and circulated, were taken as read and signed as correct.

Applications for Restoration

(*a*) An application was received for the restoration to the Register of the name of Mr. W. Rostron, it having been removed in 1908 under the provisions of Section 5, Sub-section (4) of the Veterinary Surgeons' Act.

It was resolved to recommend, "That subject to the statutory declaration being properly completed, the Registrar be directed to restore the name of Mr. W. Rostron to the Register."

(*b*) An application was received for the restoration to the Register of the name of Mr. Roger de C. Moore, it having been removed under the provisions of Section 5, Sub-section (4) of the Veterinary Surgeons' Act.

It was resolved to recommend, "That the Registrar be directed to restore the name of Mr. Roger de C. Moore to the Register."

Worshipful Company of Farriers.—An invitation was received from the Worshipful Company of Farriers to appoint a representative of the Council on the Registration Committee of the Company, in place of Mr. J. Willett resigned.

It was resolved, "That Mr. J. W. McIntosh be appointed a representative of the Council on the Registration Committee of the Worshipful Company of Farriers."

Cases

2559a. Dier, H. V., Crowborough. This member appeared on the summons of the committee to answer a charge of covering.

The Registrar read the charge to the effect that he employed his brother, Basil Dier, who has no veterinary qualification, to carry out veterinary treatment or veterinary operations on his behalf (*a*) by employing Mr. Basil Dier as manager of a branch practice and (*b*) by permitting Mr. Basil Dier to act for him in attending on animals and in one particular instance in respect of which an affidavit was submitted, permitting Mr. Basil Dier to carry out the tuberculin test. Evidence in support of this charge was given by a witness.

Mr. Dier pleaded that what he had done had been in ignorance, that his brother had assisted him in this way for over 40 years and that it was well-known in the district that he was not qualified. He asked that if found guilty judgment might be suspended for three months owing to the serious illness of his wife.

Mr. H. V. Dier and the witness were then asked to withdraw.

It was resolved, (*a*) "That the committee find that the complaint made against Mr. H. V. Dier has been proved to their satisfaction and that they find him guilty of having employed Mr. Basil Dier, an unqualified person, contrary to the provisions of Bye-law 53 (*iii*) and (*iv*)."

(*b*) "That the committee recommend that in the special circumstances judgment be suspended until the next meeting of Council."

2518a. Bradley, G. L., Aylesbury. A report from the police sent on the instructions of the Home Office was submitted showing that this member

had been convicted at Aylesbury on March 1st on three charges—(*a*) Disorderly on licensed premises and refusing to quit, fine £3; (*b*) Drunk and disorderly on the highway, fine £2; (*c*) Violent and indecent behaviour at Aylesbury Police Station, fine £2. There were five previous convictions, two of them being for drunkenness. A warning had been sent by the Council on the occasion of one of these convictions in 1933.

The Secretary reported that he had informed Mr. Bradley of the nature of the report and had asked for his observations, but had received no reply.

It was resolved, "That this member be called upon to appear before the committee at its next meeting."

2604. A police report was submitted showing that this member had been found guilty of being drunk in charge of a car, with a fine of £15 and £3 12s. 0d. costs. A letter of apology was received from the member expressing his deep repentance and promising that he would never again be guilty of such an offence.

It was resolved, "That the letter be accepted and that the Registrar be instructed to address a letter of warning to this member in regard to his future conduct."

2605. A police report was submitted showing that this member had been convicted on charges of failing the record the purchase of dangerous drugs and failing to keep a Register as required by Section 11 of the Dangerous Drugs Regulations, the total fines amounting to £55 with £5 5s. 0d. costs. A letter of explanation was received.

It was resolved, "That the Registrar be instructed to warn this member as to his future conduct."

2606. Melton Mowbray. A police report was submitted to the effect that this member had been found guilty of being drunk in charge of a motor car with a fine of £25 and costs, that his driving licence had been suspended and that he had been disqualified from obtaining a licence for twelve months. The Registrar stated that although he had written three times to this member to ask for his observations he had received no reply.

It was resolved, "That the Registrar be directed to address a further letter to this member by registered post and failing a satisfactory reply, that he be summoned to appear."

Correspondence.—(*a*) A letter was received from a member complaining that another member had called to see him in answer to an advertisement announcing that his practice was for disposal and that he had seen over the premises and examined the books. He had afterwards, within a few weeks, opened a surgery and consulting room within five minutes walk of the complainant's premises.

It was resolved, "That the general question be placed on the agenda of the committee at its next meeting."

(*b*) A letter was received from a member asking for advice in connection with the filling in of certificates for the insurance of horses. The Registrar was instructed to reply that the matter was one for arrangement with the insurance companies and that it would be well to report the matter to the National Veterinary Medical Association.

(*c*) A letter was received from a member asking whether it would be in order for him to allow his name to be given as a veterinary surgeon willing to co-operate with a newly-founded Pets Service Club.

The Registrar was instructed to reply that the committee had no information as to the nature of the proposed institution and could not, therefore, give any advice. He was also instructed to make further enquiries into the matter.

The President: I beg to move the reception and adoption of this report.

Major Kirk: The committee was told by a member that he did not know that the employment of an unqualified man was professional misconduct. Ten years ago, this Council informed all the members of the profession what constituted such misconduct, but since that time a great number of men have joined our ranks, and I imagine that not all of them read our Register. I am wondering whether it would be expedient, therefore, for us to send out another circular letter, so that there could not in future be any possibility of the excuse of ignorance being put forward.

The President: They get the circular letter in the form of the Register.

Major Kirk: The member in question said that he had not read it.

The President: That is his fault. I will put the motion for the adoption of the report.

Professor Wooldridge seconded the motion, which was carried.

The Secretary: It is necessary to have a separate resolution directing the Registrar to restore the names of two members as recommended by the committee.

Professor Wooldridge: I beg to propose that the Registrar be directed to restore the names in question.

Professor Craig seconded the motion, which was carried unanimously, the required quorum being present.

Parliamentary Committee.

Captain Simpson (Chairman) presented the following report of the Parliamentary Committee, dated April 6th, and moved its reception and adoption:—

The minutes of the previous meeting, having been circulated, were taken as read and signed as correct.

Food and Drugs Bill

The following interim report of the sub-committee on the Food and Drugs Bill was read:—

The sub-committee has held two meetings to consider the Food and Drugs Bill.

This Bill provides by Section 10 that the power to seize unsound food, which by the Public Health Act, 1875, Section 116, was vested in the Medical Officer, the Sanitary Inspector or the Inspector of Nuisances, may be exercised by an "authorised officer." By Section 100, an authorised officer is defined as follows:—

"'Authorised officer' means, as respects any Council, an officer of the Council authorised by them in writing, either generally or specially, to act in matters of any specified kind or in

any specified matter and, for the purposes of the provisions of this Act relating to the taking of samples, includes a police constable so authorised with the approval of the police authority concerned."

It is the opinion of the sub-committee that this provision gives authority to a Council to appoint a veterinary surgeon to inspect meat and satisfies the demand made by the College for provision to be made whereby the veterinary surgeon can be appointed to do this work without having to be appointed as an inspector of nuisances.

It was resolved, however, that the Secretary be instructed to communicate with the Ministry of Health to ask for a definite ruling as to whether the veterinary officer or veterinary inspector of a Council can be appointed under Section 10 for the purpose of the inspection of meat.

The Secretary submitted the reply (dated March 3rd) of the Ministry of Health, the text of which was as follows:—

> In reply to your letter of the 22nd ultimo regarding the draft Food and Drugs Bill, I am directed by the Minister of Health to say that having regard to the suggested definition of the term "authorised officer" in clause 100 (1) of the draft Bill, it seems to him that the proposed provisions of Clause 10 would enable a local sanitary authority to appoint a veterinary surgeon for meat inspection purposes if they thought fit to do so. In this connection, I am also to invite attention to the comments on Clause 10 contained on page 33 of the third interim report of the Local Government and Public Health Consolidation Committee.

It was resolved (*a*) "That the sub-committee be authorised to reply to the letter from the Ministry of Health pressing for the inclusion of an amendment providing that the veterinary surgeon of a Council should by virtue of his appointment be deemed to be an authorised officer for the purposes of the inspection of food."

(*b*) "That it be a recommendation to the sub-committee to communicate with the Federation of Meat Traders Association on the matter."

Agriculture Act, 1937

The following interim report of the sub-committee on the Agriculture Act, 1937, dated January 26th, was read:—

> Colonel Brittlebank was appointed to the chair.
>
> *Reference.* (*a*) That a sub-committee be appointed to watch the interests of the Royal College of Veterinary Surgeons in any scheme put forward by the Minister of Agriculture under Part IV of the Agriculture Act, 1937, and that the sub-committee have power to co-opt.
>
> (*b*) That the sub-committee consist of the President, Colonel Brittlebank, Messrs. Holroyd, Male and Nairn.
>
> *Agriculture Act, 1937.*—A draft letter to the Secretary of the Ministry of Agriculture asking for particulars of the schemes about to be put forward by the Minister was considered and after amendment, approved.
>
> It was decided to send a copy to the Chief Veterinary Officer for his information.

The Secretary read the reply from the Ministry of Agriculture dated February 19th, 1938, explaining the allocation of duties between whole-time veterinary officers and part-time veterinary surgeons as a consequence of the transfer of functions from local authorities to the Ministry. The request of the College to be supplied with copies of any draft schemes under the Act would be borne in mind.

Private Bills.—The Secretary reported that the Aberystwyth Corporation Bill, against which the Council had petitioned, had been withdrawn.

Public Bills.—The Protection of Animals Bill and the Dogs Act Amendment Bill were submitted, but no action was considered necessary.

Dangerous Drugs Regulations.—A communication was received from the Home Office reporting that inspection of the premises of veterinary surgeons in different parts of the country had revealed that the records required to be kept under Article 11 (1) of the Dangerous Drugs Regulations, 1937, were in many cases incorrectly kept or actually missing. The Home Office asked that the attention of veterinary surgeons should be called to the necessity of keeping the records required by the Regulations.

It was resolved, "That a circular be issued to the members with the annual report drawing attention to this matter."

A draft circular submitted by the Secretary for the purpose was approved.

R.A.V.C.—The Secretary was instructed, in consultation with the President, to communicate with the Secretary for War, in the name of the Council, making strong representations against the continuance of certain anomalies in regard to pay and promotion in the R.A.V.C., and pressing for their immediate removal.

Annual Report.—The draft annual report of the work of the committee during the past year was submitted and with verbal amendments was approved.

Professor Craig seconded the motion, which was carried.

Library and Publications Committee.

Mr. Holroyd (Chairman) read the following report of the Library and Publications Committee, dated April 8th, and moved that it be received and adopted:—

The minutes of the previous meeting, having been circulated, were taken as read and signed as correct.

Librarian's Report

The Librarian submitted his report for the quarter as follows:—

Loans.—The Librarian reports that during the last quarter, 265 works were sent out on loan. The following are the detailed figures compared with those for the previous quarter and for the corresponding quarter of 1937:—

	Jan.-Mar., 1937	Oct.-Dec., 1937	Jan.-Mar., 1938
Journals	185	231	191
Books	88	48	46
Pamphlets, etc. ...	15	10	8
Reports, etc. ...	55	28	20
Totals	343	317	265

Loans to and from other societies and institutions were as follows:—

	To	From
Imperial Bureau of Agricultural Parasitology	13	—
Imperial Bureau of Animal Health	16	1
London School of Hygiene and Tropical Medicine	4	10
Medical Research Council	8	—
Ministry of Agriculture	1	—
National Veterinary Medical Association	21	—
Royal Agricultural Society	—	2
Wellcome Research Institute ...	1	—
Wellcome Research Laboratories ...	1	—
University Library, Berne	—	1
Total	65	14

In addition to the above-mentioned societies and institutions, 70 individual borrowers used the Library's lending service, against 76 and 78 in the two preceding quarters. Two hundred works were lent by post during the quarter, and 65 were borrowed personally.

Readers and Visitors.—Fifty-one readers and six others visited the Library during the quarter: the numbers for the preceding quarter were 59 and five, and for the corresponding quarter of 1937, 82 and 14.

Special Enquiries.—These included requests for literature on chemical salts in the blood of animals; vitamin E; arsenic poisoning, and various diseases of the camel.

The Printed Catalogue.—Thirty-seven more copies have been sold during the quarter, bringing the total figure up to 223.

Many medical works and others that are little required for consultation are being moved to the ground floor to make room for the expansion of the Library's stock, particularly of its journals.

During the quarter the Assistant Librarian paid a visit to the National Central Library, of which this Library is an outlier, and was able to see something of the valuable work carried out there.

Presentations.

By Lieut.-Colonel T. Dunlop Young.

Joest, E. Handbuch der speziellen pathologischen Anatomie der Haustiere. 1924-26.
Piettre. Inspection des viandes. 1921.
Martel. L'examen des viandes. 1909.
Nocard et Leclainche. Maladies microbiennes des animaux. 1903.
Woodruff. Economics of feeding horses. 1912.
Sewell. Examination of horses as to soundness, 1898.
Allen and McLure. Fox ranching, 1926.
May and Worth. Diseases of the eye. 1915.
Hayes. Stable management and exercise. 1900.
Savage. Prevention of human tuberculosis of bovine origin. 1929.
Numbers of the *Revue Générale de Médecine Vétérinaire*, the *Onderstepoort Journal of Veterinary Science*, and the Report of the Institute of Animal Pathology, Cambridge.

By Mr. J. F. D. Tutt.

Ghosh. Materia medica and therapeutics. 1930.
Vincent, Swale. Internal secretion and the ductless glands. 1924.
Hewer, C. L. Recent advances in anaesthesia and analgesia. 1932.
Bray, G. W. Recent advances in allergy. 1931.
Beaumont and Dodds. Recent advances in medicine. 1931.
Lehmann. Determinative bacteriology. 2 vols. 1930-1.
S. Africa. Dept. of Agriculture. Handbook for farmers in South Africa. 1929.
Remington's Practice of pharmacy. 1926.

By Mr. Gladstone Mayall.

Frateur, J. L. Age of the horse according to the teeth. 1923.

By Mrs. Peacey.

Many numbers of the *Journal of Comparative Pathology and Therapeutics* and of the *Veterinary Journal.*

By Mr. William Roach.

Many numbers of the *Veterinary Record* and *Veterinary Journal.*

By Colonel G. K. Walker.

Many Indian veterinary reports, reports of the Institute of Animal Pathology, Cambridge, and numbers of the *Journal of the Royal Agricultural Society.*

By Major R. F. Wall.

Many numbers of the *Veterinary Record, Avicultural Magazine, Veterinary Journal* and *Journal of the Royal Army Veterinary Corps.*

There have also been presented to the Library 20 reports, calendars, etc., and 66 pamphlets, reprints, etc.

Purchases.—Fourteen works were purchased during the quarter.

It was resolved, "That the report be received, and that the thanks of the Council be conveyed to the respective donors."

Purchases.—It was resolved, "That the following books be purchased for the Library:—

Markowitz. Text-book of experimental surgery. 21s. 6d.

Gaiger and Davies. Veterinary pathology and bacteriology. Second edition, 1938. 25s.

Bradley, O. C. Structure of the fowl. Second edition revised. 7s. 6d.

Medical Research Council. Annual Report."

Biological Abstracts.—It was resolved, "That the subscription to this publication be discontinued."

Miss Cust Memorial

A letter was received from the Secretary of the Miss Cust Memorial Committee stating that the committee desired to present furniture to the College Library in memory of Miss Cust. With the approval of the President and Chairman they had already presented a double-sided periodical stand at a cost of £17 10s. 0d. and they wished to give, in addition, eight oak chairs and four writing tables in oak.

It was resolved (*a*) "That the thanks of the Council be conveyed to the committee for the Miss Cust Memorial, and that the offer of furniture in memory of Miss Cust be accepted, it being left to the President, Treasurer and Chairman to make the selection."

(*b*) "That a suitable brass plate be affixed to the periodical stand stating that the Library furniture had been presented in memory of the late Miss Cust."

Annual Report.—The draft annual report for the year 1937-38 was submitted and considered.

It was resolved (*a*) "That the report be completed by a paragraph dealing with the work of the Registration Committee in regard to unqualified practitioners, the drafting of the paragraph to be left to the President, Chairman and Secretary."

(*b*) "That the paragraph relating to the Veterinary Education Committee be enlarged."

(*c*) "That the report, with these and other verbal amendments, be recommended to Council for issue to the profession."

Colonel WALKER seconded the motion which was carried.

House Committee.

The SECRETARY read reports of three meetings of the House Committee held on February 16th, March 4th and March 18th, showing that the committee had accepted estimates for repairs and decorations to No. 9 and No. 10, Red Lion Square, and for the provision of furniture.

The PRESIDENT moved from the chair the reception and adoption of the reports, and added: Almost the whole of this work has been done, and the Council Chamber has been redecorated.

The motion was duly seconded and carried.

Luncheon Committee.

The SECRETARY read the following report of the Luncheon Committee dated April 6th:—

LUNCHEON.—It was resolved, "That the annual luncheon be held on Thursday, June 2nd, at the Connaught Rooms."

A specimen menu at a price of 6s. was approved, subject to slight amendment to be suggested by the President to the Banqueting Manager, and it was agreed that the charge for the tickets be 6s. to include gratuities.

A list of guests was drawn up and also a toast list.

The Luncheon Committee was constituted as a Reception Committee to receive the guests.

The PRESIDENT moved the reception and adoption of the report.

Mr. LIVESEY seconded the motion.

Professor CRAIG: Will ladies be present?

The PRESIDENT: Yes, both ladies coming as friends of members and lady members.

The motion was carried.

ANNUAL REPORT

The SECRETARY: The Library and Publication Committee have gone very carefully through the annual report, and have made a few verbal alterations and suggestions. They submit it to the Council for approval, for issue to the profession before the next annual meeting.

Mr. HOLROYD: I beg to move that the draft annual report as printed, circulated and amended, be printed and circulated to the members.

The motion was duly seconded and carried.

ELECTION OF EXAMINERS

The PRESIDENT: On the recommendation of the Examination Committee I beg to move from the chair the appointment of the following Examiners in the subjects named:—

SECOND YEAR.

Physiology and Biochemistry:—
D. T. Barry, M.D., D.Sc., F.R.C.S.
F. J. Elliott, M.Sc., PH.D.

Histology and Embryology:—
A. Durward, M.D.
K. C. Richardson, M.Sc.

THIRD YEAR.

Anatomy:—
Lieut.-Colonel H. G. Bowes, F.R.C.V.S.
E. S. Shave, F.R.C.V.S., M.R.C.S., L.R.C.P.

Pharmacology and Therapeutics, Toxicology, Pharmacy:—
R. A. S. Coulter, L.P.S.I., M.R.C.V.S.
W. J. Ironside, M.P.S., M.R.C.V.S.

Veterinary Hygiene, Dietetics and Animal Husbandry:—
Col. A. G. Todd, C.B.E., D.S.O., M.R.C.V.S.
J. C. Grant, M.R.C.V.S.

Captain SIMPSON seconded the motion, which was carried.

The PRESIDENT: These Examiners are elected for a period not exceeding three years.

Professor CRAIG: Does that mean that their period of office might continue for only one year?

The PRESIDENT: Yes.

NOTICES OF MOTION

The SECRETARY: On behalf of the Chairman of the Examination Committee, I give notice of an amendment to Bye-law 67, to implement the decision of the committee with regard to the examination fee to the effect that the fee for the separate examination in animal management or for re-examination in this subject shall be one guinea, this rule to come into force for the examinations held in November, 1938, and afterwards.

The quarterly meeting of Council then terminated, and the special meeting followed immediately.

. . . . .

Special Meetings of Council

A special meeting of Council of the Royal College of Veterinary Surgeons was held at 10, Red Lion Square, London, on Friday, April 8th, 1938, immediately following the termination of the quarterly meeting. Lieut.-Colonel P. J. Simpson, D.S.O., T.D., F.R.C.V.S., J.P., President, occupied the chair, and the same members were present.

The minutes of the previous special meeting were taken as read and signed as correct.

AMENDMENTS TO BYE-LAWS

The PRESIDENT: Professor Buxton was to have moved certain alterations to the Bye-laws, but he is not able to be present. Will someone move these alterations in his absence?

Professor Wooldridge: On behalf of Professor Buxton, I beg to propose the alterations to the Bye-laws standing in his name in the agenda, as follows:—

(*i*) *Bye-law* 70. Add after the word "only," line 7, the words "if they have obtained at least 20 per cent. of the marks in that subject."

(*ii*) *Bye-law* 77 (2). All "students who obtain less than 20 per cent. of marks in the remaining subject, may be exempted from further examination in the subject or subjects in which they have passed, but must produce satisfactory evidence that they have received further instruction in the remaining subject, prior to presenting themselves for re-examination in that subject. Such students may not proceed to the next year's course of study until they have passed in the remaining subject."

(*iii*) *Bye-law* 64 (*b*). That this Bye-law be rescinded.

Mr. Livesey seconded the motion.

The President: These alterations are before you. They affect Bye-laws 70, 77 (2) and 64 (*b*). I will put the motion.

The motion was carried unanimously.

Professor Wooldridge: I beg to propose the addition of Bye-law 96 as follows:—

Bye-law 96.—The provisions of Bye-law 77 (2) shall apply to candidates examined under Bye-law 95.

The former Bye-law 96 was rescinded on a previous occasion, and this has been a blank number, so that I propose that the words which I wish inserted should become Bye-law 96.

Mr. Livesey seconded the motion, which was carried unanimously.

It was decided to hold the Confirmatory Meeting on Thursday, April 21st, at 2 p.m.

The meeting then terminated.

. . . . . .

At the Special Meeting of Council held at the College, 10, Red Lion Square, London, on Thursday, April 21st, there were present: Lieut.-Colonel P. J. Simpson (President), in the chair, Major Dunkin, Major Kirk, Messrs. Livesey, McIntosh, R. Simpson, A. Spicer and Professor Wooldridge.

Apologies for absence were received from Professor Craig, Messrs. Dolan, Holroyd and Tutt, Dr. Share-Jones, Dr. Whitehouse, Lieut.-Colonel Mulvey and Colonel Walker.

The minutes of the previous meeting were read and confirmed.

On the proposition of Professor Wooldridge, seconded by Mr. McIntosh, the alterations and additions to Bye-laws passed at the previous meeting were confirmed, and the seal of the College was attached thereto.

The Government Secretary of the Isle of Man, in the annual report on livestock, states that the island has had no foot-and-mouth disease among cattle since 1883.

N.V.M.A. DIVISIONAL REPORT

North Wales V.M.A.*

PRESIDENT'S ADDRESS AT RHYL MEETING

A meeting of the above Division was held at the Imperial Hotel, Rhyl, on Friday, March 4th, 1938.

The President, Mr. H. Llewelyn Jones, occupied the chair, and there were also present: Messrs. Booth, C. W. Cartwright, H. V. Hughes, W. O. Jones, R. S. Rowlands, W. T. Rowlands, W. Hall Savage and Wynne. Mr. L. W. Hughes (Bangor), attended as a visitor.

Apologies for absence were received from Professor Craig, Mr. E. P. Edwards, Sir Frederick Hobday, Professor Share Jones and Mr. J. L. Williams.

The minutes of the meeting held on December 3rd, 1937, were taken as read and were confirmed.

Arising out of the minutes, a discussion arose as to the advisability of proceeding further with the proposed memorial to the late Dr. Griffith Evans, in view of the decision of the N.V.M.A. Council regarding the matter. It was agreed that the South Wales Division be informed of the proposal, and that the Welsh Branch be asked to consider the matter at its next meeting.

The Honorary Secretary reported:—(i) That he had been informed by the General Secretary of the N.V.M.A. that the resolution regarding the fees for "Assisted Tests" passed at the last meeting of the Division was to be considered by the Veterinary Officers and Public Health Committee of the N.V.M.A.; (ii) That in view of Dr. Montgomerie's resignation it was necessary to appoint a member to serve in his place on the Council. It was agreed that Mr. W. T. Rowlands be appointed to serve on the Council.

Correspondence.—(i) From the Royal Sanitary Institute, inviting the Division to appoint a delegate to the Portsmouth Congress. It was decided to invite Professor Share Jones to represent the Division, should he be attending the Congress in another capacity.

(ii) From the Honorary Secretary of the Welsh Branch inviting nominations to serve on the Council of the Branch. It was agreed that Messrs Llewelyn Jones, Cartwright and H. V. Hughes be nominated representatives of the Division.

(iii) From the National Horse Association inviting the Division to subscribe to membership of the Association. It was resolved that

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the Division contribute one guinea to the Association.

Victoria Veterinary Benevolent Fund.—The Honorary Secretary drew attention to the work of the Victoria Veterinary Benevolent Fund, and the meeting unanimously agreed to contribute two guineas for each of the years 1937 and 1938.

Rules.—Attention was drawn to the fact that copies of the Rules of the Division were no longer available for circulation. It was agreed that copies of the Rules be printed in accordance with estimates submitted by the Honorary Secretary.

President's Address

Mr. H. Llewelyn Jones then rose to deliver his presidential address. He commenced with a confession that his feeling of gratification that the honour had been conferred upon him for the fourth year in succession was associated with a sense of grievance that the members had "taken the path of least resistance" by re-electing him year after year to the Presidental Chair. Continuing, Mr. Llewellyn Jones said: Every member has a duty to his Division. That duty does not cease when a member has paid his annual subscription. It is his duty also to attend the meetings, and to taken an active part in some way or another in the work of the Division, and so bear his share of the burden—if you care to call it such—for there is also a great deal of pleasure attached to it. It is a pleasure to meet one another and have a sociable talk about past and current events, and it is always an education to listen to a "paper" and then to hear various speakers discussing the points raised. Personally, I always look forward to our Divisional meetings and my greatest happiness is obtained from meeting my colleagues from all over North Wales. I always enjoy the "paper," and I thoroughly enjoy the social side of the meeting, for I think that the better we know each other the happier we shall be. After all, we are meant to be sociable beings, and a group of sociable persons is indeed a happy group. They are tolerant of each other's views and opinions and respect them. Without this toleration and respect we cannot hope to attain to a state of happy union and co-operation.

This brings me to a vital and important matter to which I wish to refer in this short address, *viz.*, the co-operation which will be necessary in the very near future when the Ministry of Agriculture and Fisheries will take over a great part of the veterinary services of our country. It will be a red letter day in the history of the veterinary profession. The whole profession is being placed "on trial," and time alone will show how it will emerge from it—its reputation will be either very considerably elevated or it will fall to a great depth. It is up to every member of the profession to see that the latter does not occur. Most of us here are general practitioners and thanks to the Council of the N.V.M.A., and its Consultative Committee, who have put up a wonderful fight on our behalf, the practitioners are to form part of the new machinery, coming into action on the first day of April.

I have been thinking, what is it that I personally can do to make this undertaking a success? I must first of all realise that not only is our profession as a whole "on trial," but that I myself, as a practitioner and part-time officer, am personally "on trial." It is for me to bear in mind that to that extent my profession will be made or marred by what I do and how I do it. What is it I must see to? In a nutshell, it is this—my loyalty and integrity must be unimpeachable. I must, first of all, be loyal to myself—then to my colleagues, then to my District Officer, then to my Area Superintendent and so on to our Chief. Loyalty is a great thing, but we must start with loyalty to ourselves. From that, loyalty to others will emanate. Then the other requirement is "integrity." This must be the watchword of everybody—whole-time as well as part-time officers. Duties must be performed without fear or favour.

It may not be easy for some of us to fit ourselves as essential parts into this new machinery. I, personally, do not envy the man who has to put this machinery together. In our case, in North Wales, that onerous and unenviable duty has fallen to our colleague, Captain Millington. It will be his duty to collect these component parts—practitioners and whole-time officers—and join them together to make the great machine. It is bound to take time and no little trouble to get this going smoothly. No doubt, some cog-wheels can be slipped in more easily than others, but with patience, tact and forbearance, both on the part of the assembler and assembled, I have no doubt that the whole machinery will very soon be running smoothly and efficiently. It will be impossible to satisfy everybody, but we must be prepared to give and take. It is possible that some of our older members will not be included in the new undertaking on account of the age limit, but I am sure they will not grudge the younger ones their opportunity. There are also many of us who are drawing towards that age limit, but capable of rendering good service for many a year yet. Let us do our best for our country, our profession and ourselves before that day comes. What will happen when our services are no longer required we do not exactly know, but it appears likely that whole-time officers

will be appointed as, one by one, we become relegated to the routine of general practice.

What the life of a general practitioner will be like in 20 years' time, I do not know. It stands to reason, in my opinion, that there will be fewer of them, that they will have greater distances to travel, and it seems to me that they will be left with the most arduous and unpleasant part of veterinary work. It is however "an ill wind that blows no good," so let us be optimistic and hope that the future of general practitioners will not be as dark and dreary as we paint it to-day. After all, every cloud has a silver lining.

When we next meet I hope to enrol as members of this Division the Ministry's Area Superintending Officer, the various District Officers and any other Officer within the area. We must not forget that we have now a Welsh Branch of the N.V.M.A.—the annual subscription to which is indeed a very small one—and every member of the North and South Wales Divisions is eligible for membership.

On the proposition of Mr. W. O. Jones, seconded by Mr. W. T. Rowlands, a hearty vote of thanks was accorded to the President for his stimulating address.

Nominations and Elections.—The following were nominated for fellowship of the Division:—Mr. T. G. Millington (proposed by Mr. Llewelyn Jones, seconded by Mr. W. G. Rowlands); Mr. H. M. Salusbury (proposed by Mr. Wynne, seconded by Mr. H. V. Hughes).

The following, having been nominated at the last meeting, were unanimously elected to Fellowship: Messrs. W. F. Aston, A. G. Benyon and E. D. Jenkins.

Nominations to N.V.M.A. Council.—The Honorary Secretary read a letter from Mr. Edwards suggesting that the Division should appoint another member in place of himself on the N.V.M.A. Council. The Honorary Secretary was requested to inform Mr. Edwards that it was the unanimous wish of the meeting that he should continue to represent the Division on the Council for 1938-39. Professor Share Jones was re-appointed the other representative of the Division on the Council.

Paper.—The President called upon Mr. W. T. Rowlands to read his paper on "Some Local Sheep Disease Problems."

Following upon the discussion, the President proposed a hearty vote of thanks to Mr. Rowlands for his interesting and informative contribution, and this being seconded by Mr. Cartwright was carried amid acclamation.

[The paper is reproduced earlier in this issue.—*Editor.*]

Next meeting.—With regard to the next meeting to be held in July, the President said he desired to extend a hearty invitation to the members to meet at his residence in Denbigh.

It was agreed that the kind invitation of Mr. Llewelyn Jones be accepted, and that the meeting take the form of an open discussion on the reorganized Public Health Service, when it was hoped that the newly-appointed Inspectors of the Ministry of Agriculture in the area would attend.

Howel V. Hughes, *Hon. Secretary.*

REPORT

City of Birmingham Veterinary Department

Report for the Year 1937

This, the fifty-seventh annual report, deals with the work carried out by the Veterinary Department for various committees of the Corporation.

In connection with the Markets and Fairs Committee it shows that inspection of meat and other food is carried out at the abattoir and private slaughterhouses in the town and at all the food premises and shops in the city area.

The next section of the report deals with the work carried out under the Diseases of Animals Acts for the same committee.

The second part of the report gives an account of the work for the Public Health Committee in connection with the various Milk and Dairies Acts and Orders. It shows that with regard to bulk samples, 2,267 were taken during the year, of which 232, or 10·2 per cent., were found to be infected with tubercle bacilli. In the city area there are 76 dairy farms, housing 1,207 milch cows; of these 19 are "accredited" herds.

The last section of the report deals with the Corporation stud. It shows that the Birmingham Corporation own 360 horses and gives an account of the food and bedding for the year, averaging 10s. 9·6d. per horse per week. It also deals similarly with the various foodstuffs and forage bought for the other animal-owning committees of the Corporation, the amount of foodstuffs purchased by the Veterinary Department during the year totalling 2,708 tons.

Last weekend a serious outbreak of anthrax was reported on the property of Mr. Wyatt Paul, of Pangdean Farm, Clayton Hill, near Brighton. Five cows died and, under the supervision of a Ministry of Agriculture inspector, 170 were inoculated. All milk from the farm was first sterilised and then destroyed.

IN PARLIAMENT

INSPECTION OF MEAT: POSITION OF VETERINARY SURGEONS

N.V.M.A. Representations to Joint Committee

The Joint Committee of the Lords and Commons considering the Food and Drugs Bill, presided over by Lord Onslow (Chairman of Committees), at the second session subsequent to that reported upon in our issue of last week, heard evidence from Dr. W. R. Wooldridge, representing the National Veterinary Medical Association. Dr. Wooldridge suggested an amendment to Clause 100 to provide that the veterinary surgeon of a council should, by virtue of his appointment, be deemed to be the authorised officer for the purposes of the provisions of the Act as to the inspection of food and taking of samples. Meat inspection, he said, was undertaken by the medical officer, the veterinary surgeon, and the sanitary inspector. The medical officer and sanitary inspector were authorised to act as meat inspectors by virtue of their appointments, but a veterinary surgeon must be appointed first as a sanitary inspector before he could act as a meat inspector. England was the only country in which this was done.

Sir John Maude, representing the Ministry of Health, said that the amendment would mean the creation of a third statutory officer, and it would be opposed by some local authorities and by the Sanitary Inspectors' Association.

Lord Addington suggested an amendment that where a local authority had a veterinary surgeon he should automatically be the meat inspector.

On the Chairman's suggestion it was agreed to ask local authorities for their views on the matter, and the committee adjourned.

From the point of view of the N.V.M.A. the above session was particularly noteworthy, in that it marked the first occasion when the Association was represented at the committee stage of a Bill. Moreover, the debate on the points at issue raised by the N.V.M.A. lasted for at least 20 minutes; we are unable, however, to publish a verbatim account, as this is precluded by the rules of the House.

A Satisfactory Compromise

Our readers, especially those engaged on public health duties, will be pleased to learn that, arising out of the representations made by the N.V.M.A. on the committee stage of the Food and Drugs Bill, a satisfactory compromise concerning the position of the veterinary surgeon for the purposes of meat inspection has been arrived at. At the resumed hearing, on Wednesday last, the following amendment of Clause 100 was brought forward, Dr. Wooldridge making it quite clear to the Joint Committee that the Association was happy to accept it:—

"Food and Drugs Bill. *Clause* 100, page 72. Leave out lines 17 to 20 and insert:—

Provided that—

(*a*) The Medical Officer of Health and Sanitary Inspector of a Council shall, by virtue of their appointments, be deemed to be authorised officers for all purposes of this Act.

(*b*) Any member of the Royal College of Veterinary Surgeons employed by a Council (for the purpose of the inspection of food) shall be deemed an authorised officer for the purpose of the examination and slaughter of meat under the provisions of this Act relating to unsound food.

(*c*) No officer of a Council other than the Medical Officer of Health, a Sanitary Inspector or a Member of the Royal College of Veterinary Surgeons (employed as aforesaid) shall be authorised to act in relation to the examination and seizure of meat."

To make the import of this amendment clear, we reproduce the relative paragraphs of the Bill as originally drafted:—

"'Authorised officer' means, as respects any council, an officer of the council authorised by them in writing, either generally, or specially to act in matters of any specified kind or in any specified matter and, for the purposes of the provisions of this Act relating to the taking of samples, includes a police constable so authorised with the approval of the police authority concerned.

"Provided that the Medical Officer of Health and Sanitary Inspector of a Council shall, by virtue of their appointments, be deemed to be authorised officers for all purposes of this Act."

. . . . .

At a session held on the previous day, the Joint Committee learned from Mr. F. W. F. Arnaud, county analyst of Kent, that the Society of Public Analysts wished the committee to consider a definition for milk. It seemed that the farmer, in distributing milk, was entitled to give preference to certain customers, and it was also perfectly legal for him to sell poorer milk and to keep the richest portion for his own use in rearing cows. He asked that milk should be defined as "milk from a cow or cows, which have been properly and fully milked."

Sir John Maude, who represented the Ministry of Health, said it was not desired to deal with the point in this Bill. The Government issued a White Paper last July outlining certain legislation, and gave an assurance that they would bring in a Bill on those lines. How far it would deal with the particular point of definition he did not know.

Mr. Robert Bernays (Under-Secretary to the Ministry of Health): I think we can proceed on the assumption that the Government are going to produce a Bill.

On the definite assurance that the Government would bring in a Milk Bill, the Chairman suggested that the amendment be eliminated, and the committee agreed to that course.

. . . . . .

The following are among the questions and answers recorded in the House of Commons recently:—

Foot-and-Mouth Disease

Major Carver asked the Minister of Agriculture (May 12th) whether he can make any statement as to the extent of foot-and-mouth disease during the last three months; whether there are signs that its virulence has abated; and whether, in that case, its decline here coincides with a similar decline on the Continent?

Mr. W. S. Morrison: Only one outbreak of foot-and-mouth disease has occurred in Great Britain during the past 14 days, namely on May 4th, in Bedfordshire, an existing infected area. During the three months, February to April, the number of outbreaks was 73 compared with 226 during the preceding period of three months, November to January. The character of the disease during the latter period appears to have been less virulent than in the autumn and winter. The figures in the following table indicate the extent of the decline in the number of outbreaks recorded in the official bulletins, relating to certain countries of Western Europe, which have so far been received by the Ministry.

Month.	Great Britain.	Belgium.	France.	Germany.	Netherlands.	Switzerland.
1937						
November	64	22,331	47,657	11,739	31,230	101
December	87	22,419	45,085	21,604	13,410	153
1938						
January	75	6,653	26,743	18,573	* 5,348	148
February	26	2,111	14,565	13,462	1,622	42
March	12	1,996	12,934	25,119	} not yet	36
April	35	770	—	12,471	} received	19
		(1st–15th)		(1st–15th)		(to 17th)
May	1			Not yet available		

Livestock (Slaughterhouses)

Mr. Hepworth asked the Minister of Agriculture for how long the Livestock Commission has had under consideration schemes submitted by local authorities and other bodies for the establishment of central slaughterhouses; and whether, as pending a decision in this matter no approval can be given for the building of any new slaughterhouse in this country, steps can be taken to expedite a decision on the part of the Livestock Commission?

Mr. W. S. Morrison: I am informed that, after informal consultation with the Livestock Commission, a number of local authorities and other bodies are now preparing proposals which might form the basis of slaughterhouse schemes under the Livestock Industry Act; but no detailed arrangements have yet been completed or submitted to the Commission for consideration. The provision of an experimental central slaughterhouse under the Act is an undertaking which necessarily involves very careful consideration by the body concerned, and in these circumstances, I understand, the Commission feel that adequate time should be allowed for the preparation of proposals.

. . . . . .

Warble-Fly Dressing Order (Prosecutions)

Mr. Graham White asked the Minister of Agriculture the number of prosecutions which have taken place for non-compliance with the Warble-fly Dressing Order?

Mr. W. S. Morrison: The Warble-fly (Dressing of Cattle) Order of 1936, is required to be enforced by the local authorities by whom any legal proceedings would normally be taken. Notification has been received of eight prosecutions undertaken by local authorities during 1936, the first year of the operation of the Order, and of 51 prosecutions during 1937. Details of any prosecutions in respect of the current year have not yet been received from local authorities.

. . . . . .

Poultry Industry (Chick-Sexing)

Sir A. Baillie asked the Minister of Agriculture whether his attention has been called to the practice adopted by large poultry hatcheries in this country of sub-letting to the smaller hatcheries the Japanese chick-sexers whose services they have obtained for the season for a lump sum; whether he is aware of the profits which are made in these transactions; and what steps are being taken to train an adequate supply of British chick-sexers to perform this work?

Mr. W. S. Morrison: I am aware of the existence of the practice referred to, but I have no information as to the terms of the arrangements made with the smaller hatcheries. A regards the third part of the question, I understand that the encouragement of proficiency in chick-sexing has been considered on several occasions by the National Poultry Council; that one examination in this subject has already been held by the Council; and that a further one may be held in the near future.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

May 23rd.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 4 p.m.

May 25th.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, at the Society's House, 1, Wimpole Street, W., 5 p.m.

May 26th.—Last day for return of voting papers, R.C.V.S. Council election.

May 26th.—Annual Meeting of the West of Scotland Division, N.V.M.A., at Glasgow.

May 27th.—Meeting of the Yorkshire Division, N.V.M.A. at Leeds, 3 p.m.

June 2nd.—Meeting of the Central Veterinary Society, at Conway Hall, Red Lion Square, W.C.1, 6.30 p.m.

June 2nd.—R.C.V.S. Annual General Meeting. Election of Council.

June 2nd.—R.C.V.S. Annual Luncheon.

June 9th & 10th.—D.V.S.M. written examination.

June 13th.—D.V.S.M. oral examinations begin.

June 22nd & 23rd.—R.C.V.S. Committee Meetings.

June 24th.—R.C.V.S. Committee and Council Meetings.

June 30th & July 1st.—R.C.V.S. written examinations.

Aug. 21st-25th.—Thirteenth International Veterinary Congress, Zürich.

Aug. 26th-27th.—Thirteenth International Veterinary Congress, Interlaken.

Sept. 5th-9th.—Annual Congress, N.V.M.A., at Glasgow.

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THIRTEENTH INTERNATIONAL VETERINARY CONGRESS

We would draw the attention of those of our readers intending to participate in the above Congress to the communications appearing in our correspondence columns from the Hon. Secretary of the British National Committee, and from the official travel agents, stressing the desirability of early booking for travel and for hotel reservations. It will also be noted that an attractive itinerary, additional to those already published, has been arranged.

* * * * *

PERSONAL

Birth.—At Lynedoch Nursing Home, Glasgow, on May 16th, 1938, to Doris (*neé* Fraser), wife of A. D. Campbell, M.R.C.V.S., a daughter.

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Marriage.—Watkins—Main. On April 28th, 1938, at St. Saviour's Church, Stockport, by Canon M. A. Green, of Manchester, Cyril Victor Watkins, M.R.C.V.S., D.V.S.M., second son of the late W. P. Watkins, and Mrs. Watkins, of 7, Henley Grove Mansions, Henleaze, Bristol, to Margaret Louise Main, B.Sc. (Hons.), third daughter of Dr. G. A. Main, M.B., C.M., and Mrs. Main, of "Broomfield," Davenport Park, Stockport.

. . . . .

On Leave.—Mr. J. A. Griffiths, F.R.C.V.S., D.D.V.S., Nigeria, has arrived on vacation leave. Captain R. Daubney, O.B.E., M.Sc. (Wash.), M.R.C.V.S., Director of Veterinary Services, Kenya, arrived in this country during April, on leave.

. . . . .

U.S. Fellowship for Veterinary Student.—We are interested to note that Mr. Herbert Butler Parry, a student at the Royal Veterinary College, London, who is taking his Final Examination in July, has been appointed by the Committee of Award of the Commonwealth Fund Fellowships to one of the Fellowships tenable by British graduates in American Universities for the two years beginning September, 1938. These Fellowships are offered by the Commonwealth Fund of New York, of which Mr. Edward S. Harkness is President.

Mr. Parry, who was born in 1912, entered Queen's College, Cambridge, from Monkton Coombe School. At the University he read botany, chemistry and physiology for Part I of the Natural Sciences Tripos, and physiology for Part II, being placed in Class II, Division I (June, 1933).

During 1934, Mr. Parry was working under Sir Joseph Barcroft in the Physiological Laboratory, Cambridge, on the effect of reduced oxygen tension on haematopoiesis and at the Institute of Animal Pathology, Cambridge, on the anaemia of young pigs. Later he was associated with Sir Charles Martin in work on the nutritional requirements of pigs.

He commenced his veterinary training in January, 1935, at the Royal (Dick) Veterinary College, where in July, 1936, he was awarded the Senior Anatomy Medal. In October, 1936, he moved to the Royal Veterinary College, London.

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R.C.V.S. OBITUARY

Brown, John, M.R.C.V.S., D.V.S.M. (Vict.), 55, York Place, Perth. Graduated Glasgow, April 1st, 1896. Died May 5th, 1938.

The Late Mr. John Brown

A Tribute

In connection with the death of Mr. John Brown, M.R.C.V.S., D.V.S.M. (Vict.), of Perth, which we record above with much regret, we publish the following tribute received from "W. N."—one of his professional colleagues in the North:

"Many in the veterinary profession will learn with sad surprise of the passing of Mr. Brown who had been a member for 42 years, although his appearance and energy suggested a much younger man.

"The son of a farmer in Airdrie district, he spent most of his school days in Glasgow where he later attended a course in agriculture and was the holder of a diploma in that science. Later he took the professional course at the Glasgow Veterinary College and graduated in 1896.

"Assistantships in various parts of the country followed but the period of his training, which made the greatest impression on his work, was a term of nine years spent with that excellent

teacher Mr. W. Woods, of Wigan. During that period he studied at Manchester and was awarded the Diploma in Veterinary State Medicine. For a short time thereafter he was carrying out the inspection of dairy cows under Lanarkshire County Council before they had a whole-time officer.

"About 30 years ago Mr. Brown came to Perth and started practice. This period in Perth was interrupted by a few years in North and South America, attached to the remount department. Subsequent to this activity, he continued his labours in Perth where he built up one of the largest practices in Scotland. On several occasions he was selected to act as veterinary surgeon for the Highland Show. To the Perth City Council and County Council his services as a part-time officer gave much satisfaction while the Department of Agriculture for Scotland were equally appreciative of those he rendered as an examiner of stallions.

"During the last few years he did not enjoy robust health and disposed of his practice to his assistant, Mr. G. Weir, but his natural keenness would not permit retirement until a serious illness laid him aside this year.

"In his passing the profession has lost a very loyal member and one endowed with marked ability. Among agriculturists I feel sure he was, over a large area of Central Scotland, one of the most trusted and popular practitioners; his greatest joy was in serving his many clients and never was such service more loyally rendered.

"To his professional confrères he was a loyal and helpful friend and many will lament his passing."

. . . . .

The interment, which took place on May 7th at the burial ground of Native Parish of Old Monkland, Coatbridge, was largely attended by relatives and friends.

A number of his fellow members of the profession paid their last respects, there being present the President of the N.V.M.A. (Captain Donald Campbell), Messrs. J. Anderson, Keith; J. Macfarlane, Glasgow; A. Mitchell, Glasgow; W. Nairn, Blairgowrie; Major A. Spruell, Dundee; Messrs. Weir and Thomson, Glasgow, and Mr. G. Weir, Perth.

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LEGAL NOTES

Bournemouth Typhoid Outbreak: Damages Against Dairy.—In an action recently heard in the King's Bench Division, the hearing lasting five days, damages totalling £925 were awarded to six members of a solicitor's household who suffered in the Bournemouth typhoid outbreak of 1936, against a dairy firm who were alleged to have supplied them with infected milk.

Mr. Justice Lewis held that there had been breach of warranty and breach of statutory duty by the Model Farms Dairies (Bournemouth), Ltd. (now in liquidation), of Sandbanks Road, Parkstone, Dorset. He awarded £400 to Mr. A. H. Square, solicitor, of Twyford, Berkshire, £250 to Mrs. Square; £50 to their son, David William; £60 to their daughter, Diana May; £60 to Miss Elizabeth Maud Bassett, of Leighton Buzzard; and £105 to Miss Yolandi Mouat Balthasar, of Leyton. Mrs. Bassett, mother of Miss Elizabeth Bassett, was also a plaintiff, but the judge held that she was not entitled to recover damages.

There had also been an allegation of fraud against the dairy company, but Mr. Justice Lewis said he was not satisfied that there was a case for the dairy company to answer on this issue.

The defence was a denial of the allegations and a plea that the matters complained of were too remote in law.

Mr. Justice Lewis said that it was "a terribly serious case," not only for the plaintiffs, but for the defendants, who until then had carried on business successfully and had the highest reputation as sellers of clean, high-grade milk.

The milk that caused the trouble, he said, was that supplied from part of a farm occupied by a Mr. Newman. "I have seen Mr. Newman in the witness box," the judge said, "and I have come to the conclusion that there is not the slightest ground for suggesting that the milk supplied by him was not treated as it should be. His utensils were clean and his sheds and his animals were clean. He did the whole of the work himself on the farm and there is nothing that can be said against his methods. I have also seen Mr. Long, managing director of the dairy company, in the witness box," the judge added. "All his life, Mr. Long, it appears, has been an enthusiastic apostle of clean milk and had twice obtained a certificate of merit for clean milk in the county of Dorset. He knew the farms from which he obtained his supplies and was conversant with the men and methods, and in so far as inspection was concerned there was nothing more he could have done."

"Bulked" Supplies

On the question of "bulking" of milk, the judge said he was satisfied that this was the usual custom so far as large dairies were concerned. He had come to the conclusion that there was no evidence of negligence. There was thoroughly efficient inspection and supervision.

The infection in the milk was entirely unknown to the company. Although they were not guilty of fraud and negligence, they were guilty of a breach of statutory duty and breach of warranty.

Stay of execution was granted pending a possible appeal.

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"FIFTY YEARS' PROGRESS IN MEAT INSPECTION"

In connection with the celebration of the jubilee of the *Meat Trades Journal*, noted in our last issue, Lieut.-Colonel T. Dunlop Young, O.B.E., M.R.C.V.S., D.V.S.M., contributes to the issue of May 12th an informative contribution dealing with the many changes which have taken place in connection with the meat trade of Great Britain, with particular reference to meat inspection.

"Fifty years ago," writes Colonel Young, "our country received the meat necessary to supply the deficiency of home produce in the form of live animals. The animals were allowed to be distributed throughout this country, but in 1892 the now Ministry of Agriculture prohibited imports from the Continent. Subsequently we received our supplies from the Dominion of Canada, Argentina, and the U.S.A., and the animals had to be slaughtered at the ports of landing. Still later, due to the discovery of foot-and-mouth disease in South American animals, importation was prohibited from that part of the world and gradually the numbers of animals from the U.S.A. and Canada diminished until they gradually ceased. At the beginning of the same period (1880) frozen meat began to arrive in Britain. . . ."

In regard to meat inspection, Colonel Young

reminds us that 50 years ago there was practically no meat inspection, as it is understood to-day, in existence. A few large towns had men appointed as meat inspectors. The qualifications of these men varied, a few, *e.g.*, in the City of London, who had some experience of the meat trade were selected, but influence with the powers that be, had, in many cases, much weight. Even until lately, inspectors were in office who never underwent a course of training at any institute or college or submitted themselves to an examination or obtained any certificate. In a large town, within the last 50 years, the inspection of meat was entrusted to members of the police force who had no training in, or knowledge of, the subject. In country districts butchers never heard of meat inspectors.

"About 1906 a book entitled 'The Jungle' was published in the U.S.A., which described in detail the unhygienic methods of slaughtering of animals and converting of the carcases into meat for human consumption, also the absolute lack of inspectors with any scientific knowledge of the *post-mortem* appearance of the lesions of disease which could be found in carcases and organs. This resulted in the U.S.A. appointing a Commission to investigate the conditions described. The report not only confirmed the conditions described but made recommendations for the establishment of a Government Department concerned entirely with the *ante-mortem* and *post-mortem* inspection, also the hygienic supervision of all aspects of the meat industry. The persons appointed as inspectors must have special training and hold certain certificates. This Department is to-day the Bureau of Animal Industry.

"Reports as to the active and important progressive changes that were taking place stirred many local authorities in Britain into action. Abattoirs, where thousands of animals were slaughtered, and in which no inspector, or perhaps only one, was stationed, had inspectors appointed; even then, some of those had little, if any, requisite training. Thanks to the action of the Royal Sanitary Institute, which has never received all the credit it deserves, classes were established in order to give training to inspectors in the subject of meat inspection, and in connection therewith the names of Mr. Hunting, F.R.C.V.S., late proprieter of the *Veterinary Record*, and the late Mr. James King, M.R.C.V.S., veterinary inspector at the cattle market, Islington, deserve special mention. Previously the late Professor Walley, of the "Dick" Veterinary College, Edinburgh, had initiated special training for veterinary students, and Mr. King, with Mr. Trotter, late Chief Inspector of Glasgow, were among the first students to graduate in the subject of meat inspection.

"As the importation of meat gradually increased it was realised by the Ministry of Health that some control as to the freedom from disease of such meat was necessary, and Public Health (Imported Food) Regulations were framed. . . . Subsequently, entirely new Regulations were framed (the latest came into force in April of this year) by which it is now necessary that all meat and meat products imported into this country must be accompanied by certificates approved by the Ministry of Health that the meat has been derived from animals submitted to *ante-mortem* and *post-mortem* examination and passed as suitable for human consumption to a standard of not less a degree than that set out by the Ministry of Health in its Memos. 62 and 62A/Foods.

The results of this examination of meat at the ports of entry were reported to the exporting countries, and their Governments have established entirely new meat inspection departments which have gradually increased in personnel until hundreds of veterinary officers are engaged solely in this class of work, assisted by specially trained assistants.

"It follows that with the new Regulations previously quoted, associated with the efficient inspection of animals, carcases and organs at the places of slaughter, it is not too much to say that all imported meat is, as far as humanly possible, free from disease and suitable for human consumption, and may, with confidence, be purchased by every British housewife. This, it is to be regretted, is more than can be said for all British-killed meat, for while meat inspection in large towns is generally well done it is well known that in some rural, and even urban, districts it is, under the present system of so-called meat inspection, impossible to give such an assurance. This statement can be proved by reference to the Annual Reports of Medical Officers of Health. This defect is due to the work of meat inspection in the aforesaid districts being given to sanitary inspectors whose duties are too multifarious to be, in all cases, efficiently performed in relation to the subject in question, not to the carelessness of the inspectors who doubtless carry out their duties to the best of their abilities, considering the time in which they can perform them. . . ."

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NATIONAL HORSE ASSOCIATION

Submitting the Council's report at the annual general meeting of members of the National Horse Association of Great Britain, Major H. Faudel Phillips expressed the opinion that the past year had been a very satisfactory period of progress. He felt that the appointment of a Draught Horse Committee to deal with suggestions and proposals concerning heavy and commercial horses was a move in the right direction, and though known as a light horse man, yet nothing would give him greater pleasure than to see this committee actively working for the interests of the owner of the heavy horse. Sir Edward Mann, Bart., was unanimously elected President for the coming year. Sir Edward, on taking the chair, said it was his firm opinion that horses were the most economical form of transport possible, and his firm used over 120 horses. The result of the election for ten new councilmen indicated that the following had received the highest number of votes: Lady Hunloke, Captain J. E. Hance, Lady Daresbury, Colonel F. H. B. Wingfield-Digby, D.S.O., M.F.H., Captain J. Bailward, Colonel F. G. Barker, O.B.E., Mr. J. Willett, M.R.C.V.S., Mr. R. C. Balls, Colonel A. K. Main, D.S.O., and Mrs. N. B. Ducker. The Ministry of Transport had invited the Association to nominate a representative on the London and Home Counties Traffic Advisory Committee to represent users of horse-drawn vehicles in place of Sir John Moore, F.R.C.V.S., who had retired. It was decided to consult with the other two societies, who had received similar invitations, as to a joint nominee.

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HUNTERS' IMPROVEMENT SOCIETY

At a largely attend meeting of the Council of the above Society held on May 11th, Lord Mildmay, of Flete, P.C., was formally elected as President for the ensuing year in succession

to Sir Robert Spencer-Nairn, Bart. Lord Mildmay, in thanking the Council for the honour they had conferred upon him, stated that he was President in 1923, when the Society's membership was at a comparatively low ebb. He was pleased to say that since then great strides had been made in this direction and expressed the sincere hope that in this, his second year of Presidency, still further progress would be made. His Lordship had much pleasure in proposing Mr. Cecil G. Argles as President-Elect, *i.e.*, President in 1939. This proposal was unanimously carried.

Forty-eight new subscribers were elected to the membership.

Brood Mare Scheme.—It was reported that, since the February meeting, the Society had purchased eight brood mares and three had been donated. These animals had been located with reliable custodians under the Society's breeding scheme. This made a total of some 400 mares leased out under the Breeding Scheme. The Chairman of the committee expressed the sincere hope that anyone who had a mare, which was of no further use for hunting, would present her to the Society for breeding purposes. Mares thus donated are assured of a very good home and are under the personal supervision of the Society's district representatives.

Premium Stallions.—Lord Digby was unanimously re-elected, for a period of one year, as Chairman of the Stallion Committee and Hon. Director of the Light Horse Breeding Scheme. The Council desired to place on record their sincere appreciation and deep gratitude for all the excellent work which his Lordship had carried out in connection with the Premium Stallion Scheme.

Veterinary Examination.—The new venture of allowing animals, exhibited at Islington, to be examined by the Society's official veterinary surgeons prior to the show, had proved a great success and it was decided to continue the arrangements at future shows. Of the 150 hunters subjected to veterinary examination, 92 held exemption certificates, the remainder being examined at the show and passed sound. To facilitate the examination of animals entered for the show and stud book, the Council had drawn up a very comprehensive list of official veterinary inspectors covering England, Scotland and Wales. This list will shortly be available and copies can be obtained from the Secretary.

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NATIONAL PONY SOCIETY

At a recent meeting of the Council of the above Society, Major H. Faudel-Phillips was formally elected to the chair as President for the ensuing year in succession to Mr. Roy B. Charlton.

Children's Riding Ponies.—It was agreed that for the assistance of mare owners, etc., steps should be taken to compile a list of stallions suitable for siring children's riding ponies. The Secretary reported that the issue of height certificates for children's ponies and children's age certificates was proceeding at a satisfactory rate.

Mountain and Moorland Pony Committee.—Following consideration of a letter from the Welsh Pony and Cob Society, it was agreed to seek the views of the various native pony breed societies as to the position of their breeds under the grants received from the Racecourse Betting Control Board, with a view to a special meeting of the committee being convened to be attended by representatives of the Societies.

The position as regards grants for pony stallions this year is as follows: Dales.—Four premiums of £46 each; Dartmoors.—Premiums of £2 each, to be awarded for two-year-old colts at the Brimpts and Okehampton Shows; Exmoors.—Four premiums of £5 each for the best four stallions over two years old and one premium of £5 for the best colt foaled in 1936 or 1937; Fell.—Five premiums of £33 each; Highland.—One premium of £30 to the stallion Neil Gow; New Forest.—Fifteen premiums of £3 each to stallions four years old and over; Welsh.—Premiums of £10, £9, £7, £6, £5, £4, £3 and £2.

Straying Ponies.—Following consideration of a letter from the Exmoor Pony Society as to the difficulty occasioned by ponies straying through the breaking and removal of gates across roads leading from moorland, it was agreed that the Society should take up this matter with the Roads and Bridges Committees of various County Councils in an endeavour to secure that existing gates are repaired and new ones provided where necessary.

Show Committee.—This committee reported that various suggestions arising from the Society's recent show had been deferred for consideration when the prize list for 1939 is under review. Rosettes and prize cards to accompany the award of the Society's medals at agricultural shows this year were approved.

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HORSEMASTERSHIP AND SCOUTING: EMPIRE COMPETITION

The Legion of Frontiersmen have decided to organise an original competition, open not only to its own members but also to members of any body of non-regular horsed cavalry in the British Empire. The competition is being organised in honour of Captain Roger Pocock, who founded the Legion in 1904, and is still active in its interests, and will be known as the Pocock Lone Scout Trophy Competition for Horsemastership and Scouting.

Its immediate sponsors are M. Squadron of the Legion, whose headquarters are in Montreal. This squadron and its friends have provided a suitable trophy, which will remain its property, but will be sent, whenever possible, to the unit of the winner from year to year; and the squadron will provide a replica or other souvenir for the winner each year.

The organisers, who include Lieut.-Colonel Harwood Steele, now commanding the Duke of York's Royal Canadian Hussars, Lieut.-Colonel J. K. Keefler, and Colonel Sir Henry Gray, have devised a competition in full consonance with the character of the Legion and the record of its founder. The Legion itself is well known as a self-supporting voluntary organisation, composed of those who have served the Empire in many capacities, and who, while at present unable for various reasons to be members of the Empire's armed forces, are anxious to continue to serve in any capacity both in peace and war.

A 3,600-Mile Ride

"Among Captain Pocock's many adventures," says *The Times*, in making the foregoing announcement, "which include service in the North-West rebellion of 1885 and continuous service throughout the War of 1914-18, the most

famous is a solitary ride from Fort Macleod, in Alberta, to Mexico City—a distance of 3,600 miles through then difficult and largely unknown country at 18 miles a day.

"These corporate and personal records have suggested the conditions of the present competition. Candidates will be required to carry out a 70-mile ride, to be covered within 36 consecutive hours along a prescribed route. Detailed rules have been prepared and circulated to officers commanding eligible units in all parts of the Empire, so that the local heats may be organised for the first competition some time during the present year.

"The conditions governing the competition require a fair degree of personal skill and of horsemastership, but are not unduly exacting when compared with the actual achievements of single horsemen or even of formed bodies of cavalry in the past. It is hoped, therefore, that the competition will prove attractive because it calls both for a spirit of emulation and for a full measure of physical fitness among the competitors. Copies of the rules may be obtained on application to the Supreme Committee, care of the Bank of Montreal, Windsor Street, Montreal, Canada."

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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THIRTEENTH INTERNATIONAL VETERINARY CONGRESS

Zurich-Interlaken, August, 1938

To the Editor of the Veterinary Record

Sir,—I shall be much obliged if you can arrange to insert the enclosed letter and particulars of an additional itinerary for the forthcoming International Veterinary Congress.

It is important to note that the American Express Company state that July 1st is the last day for applications to be received in order to be sure of obtaining the accommodation, etc., as set out in this and previous itineraries.

A certain number of applications for tickets have already been received but it is hoped that many more will decide to attend the Congress. and thus make a representative gathering of British veterinarians.

For those wishing to make a "flying visit" to the Congress, the American Express Company will be pleased to give full information as to air services and to arrange reservations. By this method of travel I understand it is possible to leave London at 8 a.m. and arrive in Zürich early the same afternoon.

Yours faithfully,
P. J. Simpson,

Hon. Secretary, British National Committee, XIIIth International Veterinary Congress.
Maidenhead.
May 13th, 1938.

The text of the letter addressed to Colonel Simpson by Mr. F. H. C. Robinson, Assistant Manager, the American Express Company Inc., 6, Haymarket, London, S.W.1, official travel agents for the Congress, is as follows:—

"It has been suggested to us that the attached itinerary would appeal to and be accepted by some delegates attending the Congress. Would you kindly have same inserted in an early issue of the *Veterinary Record*—and further we would also like to bring to the attention of such participants that in order that reservations may be made at the hotels indicated in this and the other itineraries already published in the *Veterinary Record* it would be appreciated if delegates and friends could let us have applications for railway tickets, hotel reservations, etc., by July 1st, in order not to disappoint them."

"With compliments and the assurance of service and co-operation with the travelling, hotel and banking arrangements of delegates. . . ."

Suggested Itinerary

August.

Wed. 17th.—Leave London (Victoria) at 11 a.m. *via* Dover/Calais to Paris—HOTEL GRAND.

Thur. 18th.—Paris (Est) depart 8.10 a.m. by day train to Zürich, arrive 4.14 p.m.

Fri. 19th. to Thur. 25th.—In Zürich-Interlaken. International Veterinary Congress—HOTEL DOLDER GRAND.

Fri. 26th.—Proceed to Interlaken.

Sat. 27th.—In Interlaken at leisure—HOTEL VICTORIA JUNGFRAU.

Sun. 28th.—*Via* Berne and Zürich to Constance—HOTEL INSEL.

Mon. 29th.—In Constance at leisure.

Tues. 30th.—Afternoon train to Bale and Freiburg I/B.

Wed. 31st.—In Freiburg—HOTEL ZAHRINGERHOF.

September.

Thur. 1st.—Morning train to Heidelberg.

Fri. 2nd.—In Heidelberg at leisure—HOTEL EUROPAHOF.

Sat. 3rd.—To Frankfurt A/Main.

Sun. 4th.—In Frankfurt at leisure—HOTEL CARLTON.

Mon. 5th.—Morning train to Wiesbaden—HOTEL NASSAUERHOF.

Tues. 6th.—Rhine steamer to Cologne—HOTEL DOM.

Wed. 7th.—Leave Cologne *via* Ostend/Dover to London, arriving in the evening.

The cost of the tour as outlined is £33 8s. 0d. per person based on a party of 15 or more persons. Should there be less than 15 persons in the party an increase in the cost will be necessary.

Second class transportation throughout.

Accommodation at the hotels specified in the itinerary consisting of bedroom and plain Continental breakfast only. Luncheons and dinners not included. In Paris a private bathroom will be provided with the room (there are no double rooms without private bathrooms) but elsewhere room without bath is included.

Gratuities to hotel servants.

State, sejour and municipal taxes.

Transfers between stations and hotels and *vice versa,* but excluding porterages at the various stations.

Services of an expert courier who will be with the party and will attend to all baggage matters.

Meals *en route* are not included.

* * * * *

NASCENT SULPHUR IN MANGE

To the Editor of the Veterinary Record

Sir,—There is no doubt in my mind that nascent sulphur is very useful indeed in the treatment of mange and especially so in the case of long-haired dogs and cats. I used it extensively before the War, first, if I remember rightly, about 1911 or 1912, but not at the strength mentioned by Mr. Harvey. My method was to soak the animal and wash him with soap in a bath of hyposulphite of soda (about two ounces to the gallon) to which had been added about half an ounce of dilute hydrochloric acid. For dispensing purposes I used citric acid in place of hydrochloric. I found this preparation welcome to my clients (who detest oily dressings for pet dogs) and of particular value in small long-haired dogs such as Poms and Pekes. But as to there being "no smell"! I tried many ways of overcoming this with lavender and other scents, but no dog that has had sulphur on his skin will ever do other than stink!

Yours, etc.,
G. H. Livesey.

2a, Liskeard Gardens,
Blackheath, S.E.3.
May 16th, 1938.

* * * * *

WHAT IS SWEETBREAD?

To the Editor of the Veterinary Record

Sir,—Mr. T. Lishman is correct in assuming that sweetbread is the thymus gland.

I cannot believe, however, that his friend was served with thyroid gland, which, although described by various "authorities" and misquoted in some text-books as "sweetbread," is not used for culinary purposes. The thyroid gland does not lend itself to substitution for sweetbread being small in size and red in colour whilst the two lobes are themselves macroscopically unlobulated.

Lamb's testicles and pancreas (or "gut-bread") are more likely to be substituted for thymus gland but I do not think this is often done in these days.

Mammary gland, when suitably salted and boiled, makes a very palatable cold dish (to those who do not recognise its origin or are devoid of prejudice based on ascetic or pathological grounds) and could, if carefully prepared, be more easily and successfully substituted for sweetbread than most other organs—but I do not think it is used to any extent and I doubt if Mr. Lishman is correct in assuming that he has been served with this dish.

There are several types of thymus glands known in the trade—calves' (usually regarded as the choicest), lambs' (a good second) and those obtained from other ovines and bovines. Moreover, the butcher calls that part of the thymus gland which lies in the neck the "throat-bread" and that part which is situated in the thorax the "heart-bread," since it lies in close association with the heart. The cervical portion of the thymus gland is poor in fat and elongated whilst the thoracic portion is palmate in shape, rich in fat and the lobulations are obvious. Mr. Lishman may have mistaken the "heart-bread" for mammary gland.

I am, Sir,
Yours, etc.,
H. E. Bywater.

Town Hall,
West Ham, E.15.
May 16th, 1938.

* * * * *

To the Editor of the Veterinary Record

Sir,—The following remarks may be helpful to your correspondent whose letter concerning the above query appears in the current issue of the *Veterinary Record.*

The thymus gland is the true sweetbread and is marketed as such from lambs, oxen and calves. Calf sweetbreads are the most expensive and consist of the throat- and heart-breads together, the former being the portion of the thymus gland which extends upwards along the neck in the calf, and the latter that part of the gland which extends into the thorax.

The cervical and thoracic portions of the thymus gland in the ox are usually sold separately as throat-breads and heart-breads respectively; therefore, the waiter's remark to your correspondent's friend referred, no doubt, to the cervical portion of the thymus gland (throat-bread) and not to the thyroid gland.

It is fairly common knowledge that the organs mentioned may be presented somewhat fictitiously in restaurants as sweetbreads, although I do not know that the practice is common. In some exporting countries, the natives actually consider lamb's testicle to be a daintier morsel than true sweetbread.

The pancreas is wrongly referred to in some medical text-books as the sweetbread. To the butcher it is known as the gut-bread or belly sweetbread, and when obtained in sufficiently large quantities finds a more profitable market with manufacturing chemists.

Yours faithfully,
L. B. A. Grace,
Veterinary Officer and Chief Meat Inspector, Corporation of the City of London.

Central Markets,
Smithfield,
London, E.C.1.
May 13th, 1938.

Council Election, R.C.V.S.

To the Fellows and Members of the Royal College of Veterinary Surgeons.

Ladies and Gentlemen,—In 1934 I was elected to the Council of the R.C.V.S. and I have tried my best to merit your confidence.

The new curriculum has been successfully launched and has been under the constant attention of the Council.

The inauguration of the State Veterinary Service at one time threatened the livelihood of many practitioners but a service which does not utilise the services of the practitioner cannot be of full use to the public. If the

veterinary practitioner were stripped of emoluments for his services to State or county many areas would be unable to support a qualified man and the agricultural community would suffer.

I think steps should be taken to control, regulate or put an end to unqualified practice. If it is impossible to deal with the quack by legislation, the profession should seriously consider the merits of a counter publicity campaign.

Our Colleges are full to overflowing with students and I fear there will be a glut of veterinary surgeons in the future. Would it not be better to institute some measure of control now?

As a practitioner of 40 years' standing, I understand the practitioner's needs and desires.

I realise that more and more young fellows become whole-time servants and their interests are also of great importance.

If I am again honoured by election I can assure you that I will do my best to study the interests of all branches of the profession.

Yours faithfully,
W. S. Mulvey.

Chelmsford.
May 16th, 1938.

. . . . . .

To the Fellows and Members of the Royal College of Veterinary Surgeons.

Ladies and Gentlemen,—In asking for your support in the forthcoming election, I do not claim to have any revolutionary proposals to place before you.

I am a practising veterinary surgeon of 26 years' standing, and would at all times assist in attempting to attain a better recognition of our profession by maintaining a more rigid enforcement of the bye-laws as dealt with by the Registration Committee, and greater control of therapeutic substances, particularly biological and bacterial products.

I feel convinced that a high standard of education is essential, and a closer liaison with our principal Universities desirable.

Lastly, I hope that those elected are truly representative of the profession as a whole, and not of a minority.

Yours faithfully,
J. W. Procter.

3, The Crescent,
York.

. . . . . .

Royal College of Veterinary Surgeons
Election of Council, 1938

The Lancashire, North of England and Yorkshire Divisions of the N.V.M.A., unite in requesting the interest of all Members and Fellows of the Royal College of Veterinary Surgeons in the above election. In the exercise of their professional franchise, they respectfully solicit that one of the ten available votes be given to each of the following gentlemen who are the official candidates of their respective Divisions.

T. Wilson, M.R.C.V.S.

Lancashire Division.

Signed: G. Mayall, *President.*
J. C. Baird, *Hon. Secretary.*

North of England Division.

Signed: E. R. Callander, *President.*
W. Lyle Stewart, *Secretary.*

J. W. Procter, M.R.C.V.S., D.V.H.

Yorkshire Division.

Signed: W. R. McKinna, *President.*
W. T. MacGregor, *Secretary.*

Diseases of Animals Acts

SUMMARY OF RETURNS

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic§ Mange.		Sheep Scab.	Swine Fever.	
	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Animals slaughtered as diseased or exposed to infection.	Outbreaks reported by the Local Authorities.	Animals attacked.	Outbreaks confirmed.	Outbreaks confirmed.	Swine slaughtered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 16th to 30th April, 1938	43	46	7	943	1	1	3	23	18
Corresponding period in									
1937	50	53	—	—	6	9	2	39	27
1936	16	18	—	—	8	16	1	101	61
1935	23	25	6	2,023	2	5	4	84	51
Total 1st January to 30th April, 1938	356	375	148	18,821	40	63	90	140	74
Corresponding period in									
1937	268	302	3	262	68	103	111	398	229
1936	198	239	4	379	63	192	126	746	505
1935	153	168	30	8,869	59	88	171	578	261

Note.—The figures for the current year are approximate only.

§ Excluding outbreaks in Army Horses.